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Competitiveness of Russia's Defence Industry: Weak but Steady

Analysis of Economic Indicators

Aleksi Päiväläinen & Karoliina Rajala

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ABSTRACT

This study examines the current state and future prospects of Russia's defence industry (OPK) from the economic perspective. The authors analyse the operating conditions and competitiveness of the companies in the sector. The focus is on the general development trends that characterised the sector in the 2010s, the development policy pursued by the Russian government, structural and funding arrangements and the financial standing of selected companies, based on the analysis of economic indicators (financial statements analysis). Using the findings as a basis, the authors assess whether the sector is in a position to achieve the goals set for it in the near future.

The defence industry plays an important role in Russia, politically, militarily and economically. After the disintegration of the Soviet Union and the collapse of the country's economy, the sector was plunged into a crisis. Two decades later, the sector had re-emerged as a major player and it has been extensively restructured over the past ten years and made into vertically integrated state-owned corporations. At the same time, the sector has been given a major boost by the state armament programme (GPV), under which 70% of the Russian Armed Forces equipment should be state of the art by the year 2020. The sector is also expected to diversify its production and focus more on civilian items. The hope is that the defence industry can serve as an engine for a new innovation economy.

The financial situation of the companies seems to have stabilised over the past ten years even though many of the corporations still suffer from poor profitability and high debts. The Russian government has supported the sector by means of aid programmes and debt relief, and defence industry companies have in fact been able to maintain a high level of capital expenditure in relation to depreciation. As a whole, the defence industry has been able to meet the targets set out in the state armament programme, which is an indication of substantial improvements in production capacity.

At the same time, however, the sector is still highly dependent on the state budget and the number of private investors is small. It would seem that the companies are spending very little on research and development. Moreover, gradual political isolation and attempts to achieve self-sufficiency by substituting imports with domestic production are not compatible with the diversification strategy. All this means that there is unlikely to be any substantial growth in commercially successful civilian production in the coming years.

FOREWORD

This working paper provides a contribution to the current debate on Russia by presenting an in-depth analysis of the financial standing and competitiveness of the country's largest defence industry companies.

The research used as a basis for the working paper is part of an extensive research project, the results of which were published in the research report *Russia of Power* in March 2019. The work was commissioned by the Finnish Ministry of Defence, Ministry for Foreign Affairs and the Ministry of the Interior.

Aleksi Päiväläinen (M.Sc. Eng. and Econ.) has produced the analysis of the economic indicators and the conclusions presented in the report. Karoliina Rajala has assisted in the compilation of the report's second chapter discussing the development of the defence industry.

The authors would like to thank Juha-Matti Lehtonen for critical comments on the production-economic aspects discussed in the report, Samuli Sjögren for assistance in the analysis of the companies' economic indicators and Mathieu Boulègue for a valuable exchange of views.

As the parties commissioning the report, we would like to thank both authors for their work and Aleksi for keen interest in a complex and little-known research topic.

Finally, we would like to extend our thanks to Laura Solanko for participation in this research project, for serving as the instructor of Karoliina Rajala in the Bank of Finland in summer 2018 and for comments on this working paper.

November 2019

Military Professor Petteri Lalu Assistant Professor Katri Pynnöniemi

CONTENTS

1

INTRODUCTION

1.1 Objective and structure of the study

The defence industry complex (hereafter the 'defence industry' or 'OPK') plays a key role in Russia, politically, militarily and economically. Under the military doctrine of the Russian Federation, the sector is part of the state military organisation (in Russian военная организация государства). According to the doctrine, OPK is developed as a broad-based high-technology sector of the country's economy that is able to meet the material needs of its armed forces and secure Russia's global position as a source of high-technology products and services. The doctrine sets out 15 wide-ranging development tasks for the sector, from research and innovation and international cooperation to ensuring Russia's technological independence.[1]

The defence industry is also an important economic actor because it employs an estimated two million people and accounts for between five and six per cent of Russia's industrial output and for about ten per cent of the value of its manufacturing industry. Russia is also one of the world's largest arms exporters: according to one estimate, it holds the second place with a share of about 20%.[2] The Russian government also has high expectations of OPK as a source of new success stories in the civilian sector and as an 'innovation engine' attracting investors.

Considering the role played by Russia's defence industry, relatively little has been written on the subject. The focus in Finnish research on foreign and security policy issues concerning Russia has been on political matters, military strategy and military technology. The purpose of this study is to add to our knowledge of the topic by examining it from the industrial and economic perspective. The authors examine defence industry companies as economic actors in the current Russian political context. They analyse the financial standing and competitiveness of these companies and assess

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[1] *Военная доктрина Российской Федерации 2014*, [http://news.kremlin.ru/media/events/files/41d527556bec8deb3530.pdf], referred to on 15 April 2019.

[2] Juola, Cristina; Aleksi Päiväläinen, Karoliina Rajala, Laura Solanko & Ville Tuppurainen: Resources of Russia's defence industry, in *Russia of Power*, ed. Terhi Ylitalo, Ministry of Defence, Helsinki, [http://urn.fi/URN:ISBN:978-951-663-060-4], referred to on 15 April 2019, pp. 81, 85, see also Juola, Cristina: *Venäjän puolustusteollinen yhteistyö Kiinan ja Intian kanssa 2010-luvulla.* Maanpuolustuskorkeakoulu, Helsinki 2018, [http://urn.fi/URN:ISBN:978-951-25-3057-1], referred to on 15 April 2019; SIPRI, 10 December 2018. *Global arms industry: US companies dominate the Top 100; Russian arms industry moves to second place.* [https://www.sipri.org/ media/press-release/2018/global-arms-industry-us-companies-dominate-top-100-russian-arms-industry-moves-second-place]. Referred to on 23 April 2019.

whether the sector is in a position to meet the goals set for it by Russia's political leadership. At the same time, authors also attempt to form an overall picture of the administrative and economic mechanisms used by the Russian government to steer and develop the defence industry.

1.2 Research questions

The authors sought to find answers to the following research questions:

1) What are the goals set by the Russian government for the country's defence industry?
2) How is the Russian government seeking to achieve these goals?
3) How competitive are the companies in the sector?
4) Is the defence industry in a position to meet the goals set by the country's government?

The second chapter of the report starts with a brief look at a number of key developments that followed the disintegration of the Soviet Union. The focus is on the *goals* set for the defence industry by the Russian government. After that, the authors review the *means* by which the government is seeking to achieve these goals. In recent years, they have included federation-level armament and development programmes (which have served as funding channels), innovation and research programmes, and large-scale corporate restructurings.

The *results* achieved by the defence industry with these means are analysed in the third chapter. Finally, the authors present their conclusions and assess whether the defence industry is in a position to meet the goals set for it.

1.3 Research methods and criteria

The financial situation of the companies and their operations are key factors in the analysis of their competitiveness. In this study, competitiveness is primarily examined from a quantitative perspective on the basis of financial statement analysis. Traditionally, the Russian defence industry has been a highly secretive sector, which has limited access to financial data. However, over the past ten years, as part of wider reforms, transparency has improved and new reporting practices have been adopted. The largest companies in the sector in particular have published IFRS-based financial statements, which have also included annual reports. This has been prompted by legislative changes and an active policy pursued by the Russian Ministry of Finance, and all these

developments have been in line with wider efforts to modernise the country's economy and to improve the business environment.[3]

However, with the cooling of the relations between Russia and the West, especially following the introduction of the economic sanctions, there have been moves towards more secrecy again. Under a legislative proposal submitted to the State Duma by the Russian government in late 2017, defence industry companies in particular would be able to hide financial statements information more comprehensively than before. In the critics' view, the new law is so broadly written that it would give companies unnecessarily wide leeway in concealing information and, consequently, weaken access to market information more extensively than is required from the national security perspective. This might also make Russia as a whole less attractive in the eyes of potential investors.[4]

It seems that the rights provided under the new legislation have also been used as none of the companies analysed in this study has published full IFRS-based financial statements (including notes) after 2016. Companies still publish financial statements, but they often leave out important information stating that this has been ordered by the government.

The authors rely on literature available in English and Russian as source material. The economic analysis of the defence industry draws on the IFRS-based financial statements published by the largest corporations, and these are used as a basis for an analysis of economic indicators concerning profitability, solvency and liquidity. The economic indicators and the factors behind them are analysed and compared with two European companies operating in the same sector.

To facilitate the comparisons, the financial statements based on Russia's own RAS code have not been used as source material. There are still differences between RAS and IFRS even though efforts have been taken in recent years to make the former more compatible with the international standards. For example, there may be substantial differences in turnover figures, depending on the standards used. Moreover, RAS-based financial statements are not consolidated in a consistent manner, which makes group-level comparisons difficult and time-consuming. Using RAS-based figures and making reliable comparisons would have required more research resources than were available for this study.

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[3] *Bankir.ru, 18 June 2013*, Применение МСФО в России в соответствии с Законом «О консолидированной финансовой отчетности». Вопросы и ответы. [https://bankir.ru/publikacii/20130618/primenenie-msfo-v-rossii-v-sootvetstvii-s-zakonom-o-konsolidirovannoi-finansovoi-otchetnosti-voprosy-i-otvety-10003551/], referred to on 15 April 2019.

[4] *Интерфакс, 21 November 2017*, Правительство запросило право освобождать компании от раскрытия информации. [https://www.interfax.ru/business/588358], referred to on 15 April 2019.

For these reasons, the authors decided to use IFRS-based financial statements in the calculation of the economic indicators. Reports on operations were used as a basis for key data on the companies and details of their operations. The most comprehensive information on these matters was available for the years between 2013 and 2016 and for this reason, the authors focused on this period.

The list of the world's 100 largest arms-producing companies published each year by the Stockholm International Peace Research Institute (SIPRI) was used as the second criterion for selecting material for the study. This list contains several Russian companies. The aim was to ensure that the focus in the analysis would be on the large companies relevant to the overall picture.

Using the above criteria, the authors selected the following five companies for detailed review: OAK, OSK, Vertolety Rossii, ODK and Uralvagonzavod. For reasons of general interest and political connections, Kalashnikov (known for its assault rifles) was also added to the list. Each of the companies was analysed from the perspective of profitability, liquidity and solvency. The authors also examined the volume of capital expenditure and R&D expenditure as well as their ratio to depreciation and turnover. The economic indicators only include research and development items entered as annual expenditure in the income statements, which means that development expenditure capitalised in the balance sheet has been left out. Balance sheet items are examined separately in connection with the financial analysis of each company.

The following economic indicators were collected and calculated for each company:

- turnover
- operating profit (EBIT)
- profit/loss for the period
- return on capital employed (ROCE)
- gearing
- equity ratio
- current ratio
- number of employees
- capital expenditure (intangible and tangible assets)
- capital expenditure to depreciation ratio
- research and development expenditure (in absolute terms and relative to turnover)

In 2016, these companies employed a total of about 360,000 persons and their combined turnover amounted to about RUB 1,273 billion. This means that they account for nearly 20% of the two million people employed by the sector as a whole. This can be considered a fairly comprehensive percentage even though not all subsectors are equally strongly represented. A large number of companies building aircraft and ships

are included whereas companies in electrical technology, electronics and information technology industries are absent from the list.

The details and economic indicators of the analysed companies plus the calculation formulas used are presented in Appendices 1 and 2. The table below shows the guideline values of the economic indicators and they are based on the guidelines issued by the Finnish Company Advisory Board.[5]

Table 1. Guideline values of specific economic indicators.[6]

	Interpretation				
Indicator	**Excellent**	**Good**	**Satisfac-tory**	**Fair**	**Weak**
Return on capital employed (ROCE)	more than 15%	10–15%	6–10%	3–6%	less than 3%
Gearing	less than 10%	10–60%	60–120%	120–200%	more than 200%
Equity ratio	more than 50%	35–50%	25–35%	15–25%	less than 15%
Current ratio	2.5	2-2.5	1.5-2	1-1.5	less than 1

Capital expenditure has been calculated on a cash flow basis and any purchases by subsidiaries are included. Sales or divestments have not been deducted from the sums.

With regard to research and development, adequate funding largely depends on the sector and the company's strategy. This matters is discussed in more detail in the conclusions.

In the field of competitiveness, the authors focus on a quantitative indicator analysis and for this reason, the perspectives of strategic management, such as Porter's competitiveness frameworks, are not considered. The second focus area is on the analysis of business economics, which means that general political developments are also outside the scope of the study.

[5] *Alma Talent tunnuslukuopas*, [https://www.almatalent.fi/tietopalvelut/tunnuslukuopas], referred to on 15 April 2019.
[6] ibid.

1.4 Abbreviations used in the study

The Russian and Western abbreviations used in the study are presented in Table 1. Both the full words behind the abbreviations and the explanations are given.

Table 2. Abbreviations used

Russian abbreviation	**Full words**	**Description**
ВПК	Военно-промышленная комиссия	Military-industrial commission chaired by the President
ГОЗ	Государственный оборонный закас	State defence order
ГПВ	Государственная программа вооружения	State armament programme
МСФО	Международные стандарты финансовой отчётности	International accounting standards (In this study 'IFRS')
ОПК	Оборонно-промышленный комплекс	Defence industry complex (defence equipment industry) The term 'defence industry'/OPK is used in this study.
РСБУ RAS	Российские стандарты бухгалтерского управления Russian Accounting Standards	Russia's national accounting standards
ФПИ	Фонд перспективных исследовании	Russian Foundation for Advanced Research Projects (Russian equivalent to DARPA)
Western abbreviations		
DARPA	Defence Advanced Research Projects Agency	Research organisation of the US Armed Forces
EBIT	Earnings before interests and taxes	Profit/loss before taxes and financing income and expenses (operating profit)
ROCE	Return on capital employed	
R&D	Research and development	

2

DEVELOPING THE DEFENCE INDUSTRY

2.1 Background and goals

In the Soviet Union, the defence industry was a key part of the country's planned economy. According to some estimates, the defence industry accounted for as much as 25% of the country's gross domestic product in the 1980s. Efforts were made to restructure the defence industry as part of the reform programme introduced by Mikhail Gorbachev in the late 1980s. Dissolution of the Soviet Union in 1991 led a deep downturn, which drove many of the production plants into difficulties.[7]

The development of Russia's defence industry after the disintegration of the Soviet Union can be roughly divided into three phases: collapse, adoption of market economy principles and state control. The collapse is considered to have started with the disintegration of the Soviet Union and it continued until the mid-1990s. The process of adopting market economy principles continued to about 2005, after which the Russian government has systematically strengthened its role in the country's defence industry.[8]

The disintegration of the Soviet system also meant a restructuring of the defence industry sector. Russia lost the industrial capacity located in the republics that had seceded from the Soviet Union even though links with such states as Ukraine remained strong until 2014. The economic downturn led to cuts in defence spending and arms production, which plunged the defence industry into a prolonged crisis.[9] Between 1991 and 1994, state funding was reduced to about one seventh of what it had been at the end of the Soviet period. By 1996–1998, the output of the defence industry had fallen by 80% and the workforce by about two thirds from the peak years of the 1980s.[10]

At the same time, many defence industry companies were privatised, machinery and movables were sold at bargain prices, while factories were converted into shopping

[7] Bystrova, Irina: Russian Military-Industrial Complex. *Aleksanteri Papers, 2/2011*, pp. 7–8.
[8] Kosals, Leonid; Aleksei Izyumov & Bruce Kemelgor: From the Plan to the Market and Back – The Organisational Transformation of the Russian Defence Industry. *Europe-Asia Studies, Vol. 70*, *2018*, pp. 1450–1471.
[9] Bystrova (2011), pp. 7–8.
[10] Kosals et. al. (2018).

centres and later into arts and event centres.[11] Companies engaged in export business were able to maintain at least some of their production capacity, which helped them to survive the worst years of the downturn. Between 1994 and 2001, exports doubled, from about USD 1.7 to 3.5 billion. State-owned companies were more successful as exporters than privatised ones.[12]

As a whole, the Russian defence industry was in a difficult situation at the start of the 2010s. Companies were burdened by debts that they had accumulated during the crisis years, low productivity and outdated production machinery. According to some estimates, up-to-date machinery (less than ten years old) accounted for less than 20% of all production equipment and only about one per cent of this machinery was replaced each year.[13]

In 2010, the Russian government decided to launch a new armament programme (GPV-2020), which marked a turning point in the development of the country's defence industry. The programme, totalling about RUB 20,000 billion, was four times larger than the previous programme (GPV-2015).[14] The main objective of the new programme was to raise the proportion of up-to-date weaponry from about 15 to 70% of the armed forces' equipment by the year 2020.[15] Moreover, in line with the import-substitution thinking, the aim was to increase the domestic content of weapons systems so that Russia would be less dependent on foreign components and systems.[16] In addition to these goals, the defence industry was also expected to function as the 'innovation engine' of the Russian economy. The key idea is that the research and product development work carried out in the defence industry should also have

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[11] Коллегия Военно-промышленной комиссии Российской Федерации: *Диверсификация ОПК: Как побеждать на гражданских рынках*, 2017 [http://www.instrategy.ru/pdf/367.pdf], referred to on 7 November 2018.

[12] Kosals et al. 2018, see also Pynnöniemi, Katri; Alpo Juntunen, Katja Koikkalainen, Juha-Matti Lehtonen, Kari Liuhto, Mikko Niini, Seppo Remes, Laura Solanko & Veli-Pekka Tynkkynen: The Russian defence industry and its development guidelines until 2020, in *Russia of Transformations*, ed. Terhi Ylitalo, Ministry of Defence, Helsinki 2012, [https://www.defmin.fi/files/2345/Russia_of_Transformations.pdf], referred to on 15 April 2019, p. 37

[13] Федоров, Юри: Государственная программа вооружений-2020, Власть и промышленность, *Индекс Безопасности. № 4 (107)*, 2012, [http://www.pircenter.org/media/content/files/12/13880454280.pdf], referred to on 15 April 2019.

[14] Центр АСТ: *Государственные программы вооружения Российской Федерации: проблемы исполнения и потенциал оптимизации*, Центр анализа стратегий и технологий, 2015, [http://cast.ru/files/Report_CAST.pdf], referred to on 15 April 2019, pp. 8–9.

[15] Connolly, Richard & Mathieu Boulegue: *Russia's New State Armament Programme – Implications for the Russian Armed Forces and Military Capabilities to 2027*, Chatham House, London 2018. [https://www.chathamhouse.org/sites/default/files/publications/research/2018-05-10-russia-state-armament-programme-connolly-boulegue-final.pdf], referred to on 15 April 2019, p. 4.

[16] Juola et. al (2019), p. 83.

civilian applications so that it can help to make Russian technologies more competitive in the global markets.[17] The aim was that by the year 2025, civilian production should account for 30% of the defence industry's output and as much as 50% by the year 2030. In recent years, Russian leaders have repeatedly stressed that the defence order boom has passed and that defence industry companies should seek growth and opportunities in new markets. This is widely known as the diversification strategy.[18]

Achieving the objectives would require improvements in the production capacity and competitiveness of the defence industry. To make this possible, a large number of development programmes have been prepared over the years. Innovation clusters and centres modelled on the Silicon Valley in the United States have also been established in recent years. The following chapter starts with a brief description of the key actors in the Russian defence industry, after which the authors present the objectives of the main development programmes and assess the results achieved so far.

2.2 Political steering of the research activities and key actors

The objectives set by Russia's political leadership for the development of the country's defence industry were described above. On the one hand, the aim is to achieve the goals laid out in the state armament programme, while on the other hand, the sector is also expected to develop civilian products that can find buyers in the global market. These partially conflicting policy decisions have been made by Russia's top leadership. Decision-making and discussions on issues concerning the defence industry take place on official and unofficial forums, and one of the most important of them is the military-industrial commission (VPK).

The year 2006 can be considered as the start of the renaissance of Russia's defence industry. That year, the military-industrial commission (in Russian Военно-промышленная комиссия Российской Федерации) and the committee responsible for defence materiel purchases were re-established, while the sector itself was more extensively harnessed for meeting the needs of the country's own armed forces.[19] The military-industrial commission is responsible for the comprehensive development of

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[17] *Лента.ру, 17 October 2012*, Путин подписал закон о создании Фонда перспективных исследований, [https://lenta.ru/news/2012/10/17/arf/], referred to on 12 July 2018, see also Pynnöniemi et. al. (2012) pp. 40–41.

[18] Военно-промышленная комиссия РФ (2017), see also *TACC, 4 March 2019*, Борисов: темпы роста производительности труда и выручки в ОПК выше средних по стране. [https://tass.ru/armiya-i-opk/6182770], referred to on 15 April 2019, *Ведомости, 28 July 2018*, Власти предупредили предприятия ОПК о возможном падении гособоронзаказа. [https://www.vedomosti.ru/business/news/2018/07/28/776788-vlasti-predupredili-predpriyatiya-opk], referred to on 15 April 2019.

[19] Bystrova (2011), p. 14, see also Указ Президента РФ от 20.03.2006 № 231 "*О Военно-промышленной комиссии при Правительстве Российской Федерации*", 20 March 2006.

Russia's defence industry. Its members include the Deputy Prime Minister responsible for national defence, Minister of Finance, Minister of Defence, Chief of the General Staff and the heads of the Russian intelligence agencies.[20] Since 2007, the state defence order has been prepared under the auspices of the commission, and this order serves as a basis for the purchases of weapons and defence materiel.[21] The commission also plays a key role in the coordination of the cooperation between the Ministry of Defence, Russian Defence Forces and the defence industry. The commission is supported in its work by the collegial body of the military-industrial commission operating under the auspices of the Russian government and comprising the heads and chief designers of several defence industry companies.[22]

In addition to the commission, the following bodies also play a key role in the innovation activities of the defence industry: Scientific and Technology Policy Council of the Ministry of Defence, Presidential Council for Economic Modernisation and Innovative Development, and the Council for Science and Education.[23]

The current debate is a continuation of the initiatives launched during the tenure of President Medvedev, which sought to boost technological modernisation in Russia. One of these initiatives was the Russian Foundation for Advanced Research Projects (FPI) (in Russian Фонд перспективных исследований), which operates under the auspices of the Ministry of Defence. The foundation, which was established in 2012, is seen as the Russian equivalent to the DARPA research institute in the United States. The foundation is tasked with technology anticipation, coordination of the development of new high-risk technologies, and other activities boosting innovation activities in Russia. At its establishment, the foundation was envisaged as a platform for about 150 different projects and it was planned to recruit between 100 and 150 people to work on them.[24] The current focus in FPI's research work is on three areas: chemical, biological and medical projects, physical and technological projects, and information projects.[25] Ideas for such projects are often collected through competitions.[26] It was

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[20] Президент России (2019), *Военно-промышленная комиссия Российской Федерации*, [http://www.kremlin.ru/structure/commissions#institution-41], referred to on 15 April 2019.

[21] Bukkvoll, Tor: *The Russian Defence Industry – status, reforms and prospects*, Norwegian Defence Research Establishment (FFI), 2013, [https://www.ffi.no no/Rapporter/13-00616.pdf], referred to on 29 May 2019, see also CSIS: *CSIS Presents: The Russian Military-Industrial Complex*, *video, 20 June 2017*, [https://www.csis.org/events/russian-military-industrial-complex-2017], referred to on 30 June 2018.

[22] Правительство Российской Федерации: *Коллегия Военно-промышленной комиссии Российской Федерации*, 2019 [http://government.ru/department/300/members/], referred to on 15 April 2019.

[23] Adamsky, Dmitri: Defense Innovation in Russia: The Current State and Prospects for Revival. *IGCC Defense Innovation Briefs, (5), 2014*, pp. 1–12.

[24] Лента.ру, 17 October 2012, *Путин подписал закон о создании Фонда перспективных исследований*, [https://lenta.ru/news/2012/10/17/arf/], referred to on 12 July 2018.

[25] Фонд перспективных исследований: *О Фонде*. [https://fpi.gov.ru/about/], referred to on 13 August 2018.

[26] *РИА Новости, 28 December 2017*, Глава ФПИ рассказал о работе фонда. [https://ria.ru/20171228/1511892040.html], retrieved on 1 April 2019.

reported last year that FPI is working on about 50 different projects and that more than 40 laboratories had been established to support them in higher education institutions, research institutes and defence industry companies in different parts of Russia. A research body focusing on technologies and robotics operating under the auspices of FPI was established in 2015.[27] However, there is disagreement on the results achieved by the foundation so far.[28]

However, the foundation is not the only actor responsible for developing innovation for the needs of the Russian Armed Forces. The best known of the other centres is the Skolkovo technology park, launched during the tenure of President Dmitry Medvedev. It is modelled on the Silicon Valley, and considerable resources have been channelled to the project by the Russian government.[29] The results achieved at Skolkovo have, however, been only a fraction of what was originally envisaged, and Russia's scientific community has criticised the state for not channelling resources to institutions carrying out long-term research.[30] It also seems that government funding for Skolkovo is drying up, as the technology park has sought funding from foreign venture capital investors in recent years.[31]

The latest in the series of research centres is the innovation complex Era in the city of Anapa on the Black Sea coast, which was opened in autumn 2018.[32] The Era project was launched in 2017 at the initiative of Russia's Ministry of Defence and the project was given the final go-ahead by President Putin in June 2018.[33] The purpose of the innovation centre, which covers an area of about 17 hectares, is to serve as a research cluster of Russia's defence industry, and it is hoped to attract young experts in particular. It is envisaged that the complex will employ more than 2,000 researchers and engineers by the year 2020.[34] The research work will comprise the following eight

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[27] *RIA Новости, 20 March 2018*, ФПИ предложил Минобороны стандарты для искусственного интеллекта. [https://ria.ru/20180320/1516808875.html], referred to on 3 April 2019.

[28] Adamsky (2014), p. 10.

[29] Федеральный закон от 28.09.2010 № 244-FZ "Об инновационном центре 'Сколково'", 21 September 2010.

[30] Kuzina, Svetlana & Vladimir Fortov: *What's destroying Russian Science?*, Russkiy Mir Foundation, 5 February 2012. [https://russkiymir.ru/en/publications/140319/], referred to on 10 April 2019.

[31] Butcher, Mike: *Chill Out – Russia's Skolkovo Project attempts a re-boot with a new venture fund*, TechCrunch, 2017 [https://techcrunch.com/2017/06/09/chill-out-russias-skolkovo-project-attempts-a-re-boot-with-a-new-venture-fund/], referred to on 3 April 2019.

[32] *RIA Новости, 22 November 2018*, Путин высоко оценил военный технополис в Анапе. [https://ria.ru/20181122/1533306121.html], referred to on 13 April 2019.

[33] Евдокимова, Анастасия: *Путин подписал указ о создании военного технополиса в Анапе*, Телеканал «Звезда», 25 June 2018. [https://tvzvezda.ru/news/opk/content/201806252151-543h.htm], referred to on 12 July 2018, see also Указ Президента Российской Федерации № 364, "*О создании Военного инновационного технополиса «Эра» Министерства обороны Российской Федерации*", 25 June 2018.

[34] Гундарев, Алексей: *Военный технополис «Эра» начнет работать в сентябре*, Телеканал «Звезда», 27 June 2018. [https://tvzvezda.ru/news/forces/content/201806271101-fs5o.htm], referred to on 12 July 2018.

areas: data processing and artificial intelligence systems, robotic structures, super computers, technical vision and modelling, information security, nanotechnology and nanomaterials, and energy as well as biosynthesis and biosensor technologies. The aim is to create breakthrough and dual-use technologies and develop both basic and critical military technologies. Researchers at ERA will work in close collaboration with their counterparts in FPI.

2.3 Development programmes and innovation in Russian defence industry

As described above, the Russian government is determined to modernise the technological base of the country's economy. In his 2018 policy speech, President Putin set guidelines for the development work by demanding new revolutionary innovations from the defence industry.[35] He also reminded his listeners that technological backwardness threatens Russia's national security. The speech was a continuation of the policy decisions described above, the aim of which is to enhance the competitiveness and production capacity of the defence industry.[36]

In fact, a larger number of complementary and parallel strategies and plans have been announced in Russia in recent years, and their aim is to channel resources to technological development, training and other areas of innovation in the defence industry. Between 2010 and 2017, the Russian government adopted more than 50 official documents concerning technologies, research and innovation.[37]

The Russian innovation development strategy adopted during Medvedev's presidency is one of the key documents from the perspective of the defence industry. One aim of the strategy, which extends to the year 2020, is to achieve better sharing of information between the defence industry and the civilian sector, and to develop dual-use technologies.[38] The second key document steering innovation activities is the scientific-technological development strategy for the Russian Federation, which was adopted in 2016. It sets out the goals and priorities for scientific and technological development in Russia and the measures to be taken to achieve the goals.

However, the defence industry development programme, adopted in May 2016 and updated in spring 2019, is probably the most important of these policy documents. The document has three focus areas: enhancing productivity in the defence industry, developing innovative products, and increasing domestic content of the products.

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[35] Путин, Владимир: Послание Президента Федеральному Собранию, 1 March 2018. [http://kremlin.ru/events/president/news/56957], referred to on 30 June 2018.

[36] Kashin, Vasily: Russian Defense Innovation in the 2010s. *SITC Research Briefs, 10(8), 2018*, p. 2.

[37] Adamsky (2014), p. 7.

[38] Правительство Российской Федерации: Распоряжение Правительства РФ от 8 декабря 2011 г. N 2227-р, 8 December 2011. *О Стратегии инновационного развития РФ на период до 2020 г.* (с изменениями и дополнениями).

The Russian Ministry of Industry and Trade is responsible for the implementation of the programme, the purpose of which is to boost product development, and enhance the competitiveness of the defence industry both domestically and in the international markets. A 1.9-fold increase in industrial output, increasing the proportion of innovative products to 39.2% and a 2.95-fold increase in labour productivity by the year 2027 (from 2015 levels) are some of the targets set out in the programme. Practical aims of the programme include the promotion of defence industry exports, ensuring stable production and growth in output, personnel development, and making the sector more innovative.[39]

In addition to the defence industry development programme, there are also a number of other development programmes under way. These are listed in Table 2. According to official figures, a total of about RUB 2,796 billion has been made available through these instruments, and the lion's share of the sum (about 84%) has been allocated to the development of the aircraft industry and space activities. Even though the overall figure may not be precise, it can nevertheless be considered as indicative. In addition to receiving public funding, the companies participating in the programmes must probably also bear some of the programme costs themselves.[40]

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[39] Правительство Российской Федерации: Постановление от 6 февраля 2019. Н 85-6, 6 February 2019. *О внесении изменении в государственную программу Российской Федерации "Развитие Оборонно-промышленного комплекса"*. [http://minpromtorg.gov.ru/docs/#!postanovlenie_pravitelstva_rf_856_ot_06_fevralya_2019_goda], referred to on 28 June 2019.

[40] *Коммерсантъ, 30 October 2018*, «Не может быть на десять самолетов заказано десять ракет», [https://www.kommersant.ru/doc/3785647], referred to on 15 April 2019, see also *Новости ВПК, 12 February 2019,* Развитие ОПК: Правительство утвердило новую редакцию госпрограммы развития оборонной промышленности, [https://vpk.name/news/245916_razvitie_opk_pravitelstvo_utverdilo_novuyu_redakciyu_gosprogrammyi_razvitiya_oboronnoi_promyishlennosti.html], referred to on 15 April 2019.

Table 3. The most important OPK development programmes and the funding allocated to them.[41,42,43,44,45]..

Name of the development programme	Years	Sum appropriated (RUB billion)
Developing the aircraft industry	2013–2025	990
Developing shipbuilding	2013–2030	326
Developing radio technology and the electronics industry	2013–2025	52
Developing Russia's space activities	2016–2025	1,353
Developing the defence industry complex	2019–2027	75
Total		**2,796**

Some of the funding for R&D also comes from the defence industry companies themselves but as shown by Appendix 2, these sums are fairly modest. The income statements of the companies reviewed in this study show that the R&D expenditure entered as expenditure during the financial year varies between zero and 1.88% (percentage of turnover, Appendix 2). It should also be noted that many companies have capitalised development expenditure into their balance sheets, which means that the overall situation is not as bad as the figures would indicate. This issue is examined in more detail in Chapter 3.

In recent years, Syria has played a major role in the development of new military equipment as Russia has been testing many of its new weapons systems in that country.[46] Defence Minister Shoigu told the Defence Committee of the State Duma in March 2019 that Russia has tested more than 316 new or modernised weapons in Syria.[47] Some of the products tested over the past four years have been experimental systems or prototypes that had not yet undergone normal test cycles before being

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[41] Минпромторг Российской Федерации: *Государственная программа Российской Федерации "Развитие авиационной промышленности на 2013–2025 годы"*, [http://minpromtorg.gov.ru/common/upload/files/docs/Vizualizatsiya_GP_RAP_140507.pdf], referred to on 29 June 2019.

[42] Правительство Российской Федерации: Постановление от 31 марта 2017 N 374, 31 March 2017. *Об утверждении государственной программы Российской Федерации "Развитие судостроения и техники для освоения шельфовых месторождений на 2013-2030 годы"*. (с изменениями и дополнениями). [http://minpromtorg.gov.ru/common/upload/files/docs/374_31_2017.pd], referred to on 28 June 2019.

[43] Правительство Российской Федерации: Распоряжение от 15 декабря 2012 г. N 2396-р. *Об утверждении государственной программы Российской Федерации "Развитие электронной и радиоэлектронной промышленности на 2013 - 2025 годы"*. [http://government.ru/docs/3345/], referred to on 28 June 2019.

[44] Минэкономразивития Российской Федерации: *Интернет-ресурс "Федеральные целевые программы"*, [http://fcp.economy.gov.ru/cgi-bin/cis/fcp.cgi/Fcp/ViewFcp/View/2017/443], referred to on 29 June 2019.

[45] Правительство Российской Федерации 6 February 2019.

[46] IISS: *The Military Balance 2018*, Routledge, p. 169.

[47] Государственная Дума: *Состоялось расширенное заседание Комитета по обороне*, 11 March 2019. [http://duma.gov.ru/news/30006/], referred to on 3 April 2019.

taken to Syria. It should also be noted that many of the tested weapons were later rejected.[48]

2.4 Financing arrangements

The Russian defence industry relies on three key instruments for financing. The first of them is direct budget funding through the state armament programme, which is channelled via the yearly state defence order (GOZ) (in Russian Государственный оборонный заказ). Money for three purposes has been allocated through GOZ: purchases of new weapons, modernisation and repairs of existing weaponry, and research and development. Breakdown of GPV-2020 expenditure in the period 2011–2020 is shown in Table 4. About RUB 7,000 billion of the RUB 20,000 billion originally allocated to the programme will probably remain unused. Only the end total of RUB 1,600 billion was disclosed in 2016, and no details of the breakdown were given. It is noteworthy that during the second half of the programme, the emphasis has been on the purchases of new equipment at the expense of weapons modernisation. The estimates of the funding for 2019 and 2020 are based on the commonly held view that the fat years of GPV are over.

Table 4. Breakdown of the state defence order under GPV-2020.[49]

Cost category	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019 (EST)**	**2020 (EST)**	**2011–2020**
Purchases of new equipment (RUB million)	366	447	550	943	1,188		956	1,015			
Equipment modernisation (RUB million)	92	108	178	290	360		144	150			
R&D (RUB million)	115	122	165	218	252		346	285			
Total (RUB million)	**573**	**677**	**893**	**1,450**	**1,800**	**1,600**	**1,446**	**1,450**	**1,550**	**1,550**	**12,989**
Purchases of new equipment (%)	64	66	62	65	66		66	70			
Equipment modernisation (%)	16	16	20	20	20		10	10			
R&D (%)	20	18	19	15	14		24	20			

Extensive use of advance payments has been one of the typical features of GPV funding. By the end of 2017, advance payments by the Ministry of Defence had reached a cumulative total of nearly RUB 3.5 trillion, which was 2.5 times as high as the GOZ

[48] IISS (2018), p. 170.

[49] Экспорт вооружений publications between 2015 and 2018.

of the same year.[50] Under the rules introduced in 2016, advance payments have accounted for between 10 and 40% of the contract value. This arrangement has been mainly used in long, capital-intensive projects and it has ensured the liquidity of the defence industry companies, many of which are in extremely poor shape financially.[51]

In addition to direct budget funding, companies have also been able to draw on a guarantee system, which was introduced in the years 2011 and 2012 to enhance flexibility and to meet the industry's funding needs. In this arrangement, specific banks were able to provide arms manufacturers with state-guaranteed loans at an interest rate of 10%. In fact, companies made extensive use of this financing instrument, and the loan portfolio had already reached about RUB 1,200 billion by the end of 2016. The problems were compounded by the fact that some banks had apparently been quite generous in their lending and had not bothered to check the companies' ability to repay the loans. Finally, at the end of 2016, the Russian government came to the rescue and paid back loans totalling about RUB 800 billion. In the same connection, it was also decided to discontinue the lending scheme.[52]

In addition to purchasing military equipment, the Russian government has also provided the defence industry with funding through a number of development programmes, which are listed in Table 1 in Chapter 2.3.

2.5 Developing the pricing system used in the state defence order

The pricing principles applied in the state defence order are an important economic consideration for OPK companies. Though seemingly of technical nature, this factor is essential for ensuring the operational prerequisites of OPK companies as GOZ still remains the main source of turnover for most of them. For at least ten years now, the pricing principles have been a constant source of friction between the Ministry of Defence and the companies in the sector. According to the analysts monitoring the sector, the system is extremely bureaucratic and poorly compatible with the realities of the market economy.[53] Private companies have complained that the negotiations are unnecessary cumbersome and involve too many stages, and they also claim that the prices demanded by the government negotiators are unreasonably low and that sometimes they are without any basis in reality.[54]

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[50] Зацепин, В.Б. & В. И. Цымбал, *Институциональные изменения*, Институт экономической политики имени Е.Т. Гайдара, Российская экономика в 2017 году. С. Г. Синельникова-Мурылева (ed.), Москва 2018: pp. 338–587, [https://iep.ru/files/text/trends/2017/Book.pdf], referred to on 26 June 2018.

[51] Фролов, Андрей: Исполнение государственного оборонного заказа России в 2016 году. *Экспорт вооружений, Июль-Август 2017*.

[52] ibid.

[53] Центр АСТ (2015).

[54] Коллегия Военно-промышленной комиссии РФ 2017.

Traditionally, the prices of military equipment have been regulated by the government. The pricing of the purchases made within the framework of GOZ has been based on the costs attributed by the suppliers to the development and manufacturing of the materiel. Profits have been on the basis of the 20+1 rule, under which the supplier can add a profit margin of 20% to the costs arising from its own input. In other words, the input ordered from subcontractors and other partners is first deducted from the manufacturing costs, after which a maximum profit of 20% is calculated for the remaining part. At the same time, a profit of only one per cent is permitted for subcontracting. Subcontracting often accounts for a large proportion of the total work; for example, in 2017, prime contactor allocated 57% of the GOZ to the subcontractor chain.[55] Defence industry representatives have publicly estimated that the average profit margin for the projects carried out within the framework of GOZ is usually approximately between three and five per cent.[56,57] Probably because of the 20+1 rule, companies have been unable to include depreciation and financing expenses in the manufacturing costs, which means that they have to deduct them from the profit calculated on the basis of this rule.

It should also be noted that the suppliers at the start of the order-delivery chain are exempted from the regulation, and thus prices of such items as raw materials and semiconductor materials and the prices of imported items have consistently been determined on a market basis.[58]

In the context of the development of the sector and especially from the customer's perspective, the key problem arising from the regulation has been that it has not provided any incentives to cut costs. On the contrary: efficiency improvements have led to lower profits. This has often encouraged companies to inflate break-even costs.[59,60] At the same time, the one-per cent rule has made subcontracting fairly unprofitable, which has prompted companies to minimise purchases of subsystems and components from external suppliers. The view has been that this has considerably strengthened already large OPK companies, created monopolies and substantially weakened the chances of small and medium-sized private companies to join the order-delivery chain of GOZ.[61]

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[55] Фролов, Андрей: Исполнение государственного оборонного заказа России в 2017 году. *Экспорт вооружений, 1Июль-Август 2018*.

[56] Коммерсантъ 30 October 2018.

[57] Коллегия Военно-промышленной комиссии РФ 2017.

[58] Федеральная антимонопольная служба: *1Интервью с заместителем руководителя ФАС России Максимом Овчинниковым по вопросу внедрения мотивационной модели ценообразования в сфере государственного оборонного заказа, 21 February 2018*, [https://fas.gov.ru/p/contents/2099], referred to on 15 April 2019.

[59] ibid.

[60] Boulegue & Connolly (2018).

[61] Коллегия Военно-промышленной комиссии РФ 2017.

The policy described above has probably also substantially reduced the willingness of private actors to invest in the sector, which in turn has made it more difficult for OPK to reduce its dependency on the state budget. Lack of private funding has at least partially been compensated by the development programmes discussed in the previous chapter. Attention in the public debate has also been on the price formation, which is on a highly inflexible basis and tied to the yearly state budget process. Moreover, it does not give any consideration to the special characteristics of business and project operations. For example, it has been claimed that risk management, an essential part of ordinary project business, is not in any way linked to the price formation.[62]

It seems that the existence of these problems has been recognised, at least partially, because in December 2017, the Russian government adopted the decision no. 1465 (Постановление Правительства РФ Но 1465), under which the principles governing the pricing of the state defence order were substantially changed.[63,64]

The introduction of the incentive model (in Russian мотивационная модель) has been characterised as the most significant of the reforms. The key principle is that in the future, companies can keep the savings that they have achieved through efficiency improvements. The 20+1 rule is still used to determine the basic product price (in Russian базовая цена) every five years. During this period, the basic price is reviewed each year in accordance with the indexes determined by Russia's Ministry of Economic Development. In other words, a ceiling has been set for the price paid by the customer. The basic price may, however, be reviewed during the five-year period if the break-even costs increase by more than five per cent, for example as a result of new requirements presented by the end customer or major changes in production volumes. In a second important change, the basic price is now defined on the basis of market prices whenever possible. In the past, the manufacturer's cost price was used as the reference price.[65]

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[62] *Независимое военное обозрение, 16 August 2018*, Цена обороны и оборона цены. [http://nvo.ng.ru/concepts/2018-08-16/10_1009_gosoboron.html], referred to on 15 April 2019.

[63] *Ведомости, 6 December 2017*, *Правительство утвердило единый порядок ценообразования на продукцию гособоронзаказа.* [https://www.vedomosti.ru/economics/news/2017/12/06/744312-pravitelstvo-utverdilo-edinii-poryadok-tsenoobrazovaniya-na-voennuyu-produktsiyu], referred to on 15 April 2019.

[64] Правительство Российской Федерации: Постановление от 2 декабря 2017 N 1465, 2 December 2017. *О государственном регулировании цен на продукцию, поставляемую по государственному оборонному заказу, а также о внесении изменений и признании утратившими силу некоторых актов Правительства Российской Федерации.* [http://static.government.ru/media/files/nJurC6N1kD0VixjHvJSAoGmbXKANqovO.pdf], referred to on 28 June 2019.

[65] Федеральная антимонопольная служба 4 July 2018. Федеральная антимонопольная служба. *Максим Овчинников: Постановление Правительства о ценообразовании в сфере ГОЗ меняет всю идеологию работы с кооперацией, 4 June 2018*, [https://fas.gov.ru/news/25370], referred to on 15 April 2019; Федеральная антимонопольная служба (21 February 2018).

Efficiency improvements in defence industry companies, modernisation of production technologies, improvements in management practices and attracting private investors are some of the key goals set out in the reforms. The preparations for the reform were mostly carried out by the Russian competition authority (FAS), which believes that positive results can be expected within a few years.[66]

The easing of the price controls was criticised by the Ministry of Defence experts during the preparatory stage. It was feared that the changes would give too much leeway for companies, allowing them to introduce unjustified price increases.[67] At the same time, however, top ministry officials have taken a more relaxed view on the matter and for example Deputy Prime Minister Borisov has emphasised the importance of the reforms for his own administrative branch and for the companies themselves.[68]

As a whole, both the authorities and key political decision-makers have high hopes of the price reform. It is clear that the new model will provide companies with more freedom of action and will thus make the system more market-based. At the same time, however, the state will still retain a broad range of different regulatory and supervisory powers. The reform is probably a compromise achieved in lengthy negotiations between parties holding diametrically opposing views who wanted to present a model that is also acceptable to the Ministry of Defence and supporters of a state-led industrial policy.

The reform can also be seen as part of wider efforts to develop and modernise the Russian economy and to boost the diversification strategy (to substantially increase the proportion of civilian production). Against this background, providing companies with more freedom of action is in line with the industrial-strategy goals set by the Russian government.

Well-managed companies that have already experienced free competition will probably benefit from the reform. A time span of five years will probably be a long enough period for most companies to enhance their management practices, achieve efficiency improvements and modernise production technologies. At the same time, however, companies still living in the operating culture of the planned economy may be poorly placed to develop their operations on a more independent basis. It remains to be seen whether the change will benefit or harm these actors.

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[66] Федеральная антимонопольная служба (21 February 2018).

[67] *Обозник, undated*, Проблемные вопросы ценообразования на ВВСТ, [http://www.oboznik.ru/?p=55519], referred to on 15 April 2019.

[68] *Военно-промышленный курьер, 25 September 2017*, ГОЗ под микроскопом. [https://vpk-news.ru/articles/39094], referred to on 15 April 2019.

Finally, it should be noted that these changes will in no way weaken the position of giant state monopolies, such as Rostec, or make it easier for small private companies to access the market. Thus, there is no prospect of more competition either. For this reason, it is unlikely that the reform alone would allow the sector as a whole to take a productivity leap or substantially enhance its competitiveness.

2.6 Key state-owned corporations

The goals set for the development of the Russian defence industry, contents of some of the development programmes and major actors have been described above. In this chapter, the authors discuss a process that has been underway for the past 15 years and in which defence industry companies have been built into vertical structures (huge state-owned holding companies). The aim of this process is to place the best companies and research institutions from different sectors under the same roof. This has been done to improve efficiency, to dismantle overlapping activities, to achieve extensive modernisation of the production machinery, and to restructure companies that are in poor shape and have accumulated substantial debts. The aim has also been to create attractive opportunities for a wide range of private investors.[69]

The first state-owned companies were created in 2001 and 2002 when Sukhoi (aircraft manufacturer) and Almaz-Antey (manufacturer of anti-aircraft defence systems) were established on the orders of President Putin. The aircraft manufacturer OAK, established in spring 2006, was the first of the large corporations.[70] It was followed by the shipbuilding company OSK a year later.[71] The multi-sector corporation Rostec and the nuclear weapons and nuclear power company Rosatom were also established in 2007.[72] The latest in the series is the space corporation Roscosmos, which was created in August 2015.[73] In practice, the state ownership is managed through a federal agency (in Russian Росимущество).

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[69] Pynnöniemi et. al (2012), pp. 36–37, see also *Лента.ру, 30 March 2005*, Правительство России одобрило создание военного авиахолдинга. [https://lenta.ru/news/2005/03/30/avia/], referred to on 15 April 2019, *Новости ВПК, 26 December 2007*, Создание госкорпораций стимулирует частные инвестиции в сектора экономики – Жуков. [https://vpk.name/news/12619_sozdanie_goskorporacii_stimuliruet_chastnyie_investicii_v_
sektora_ekonomiki__zhukov.html], referred to on 15 April 2019.

[70] Объединённая Авиастроительная Корпорация (ОАК), *Финансовые отчетности 2013–2016*, [https://www.e-disclosure.ru/portal/company.aspx?id=11433], referred to on 15 April 2019.

[71] Объединённая Судостроительная Корпорация (ОСК), *Финансовые отчетности 2014–2017*, [http://www.aoosk.ru/about/disclosures/], referred to on 15 April 2019.

[72] Ростех, *Годовые отчетности 2014–2017*, [https://rostec.ru/investors/], referred to on 15 April 2019. [https://rostec.ru/about/history], referred to on 15 April 2019, *presentation of Rosatom*, [http://www.rosatom.ru/about/], referred to on 15 April 2019.

[73] *Presentation of Roscosmos*, [https://www.roscosmos.ru/219/], referred to on 15 April 2019.

The large state-owned corporations, which encompass most of the defence industry companies and their employees, are shown in Figure 1. The figure shows the turnover and personnel of each corporation and the key company clusters belonging to it. These vertically integrated structures often constitute multi-tier ownership structures, which are often highly complex and difficult to dissect. The key principle is, however, that the corporations of the highest tier shown in the figure are holding companies that in practice are state-controlled and state-owned. In most cases, the next tier is also similarly structured even though it may also contain companies that are partially or mostly in private ownership.

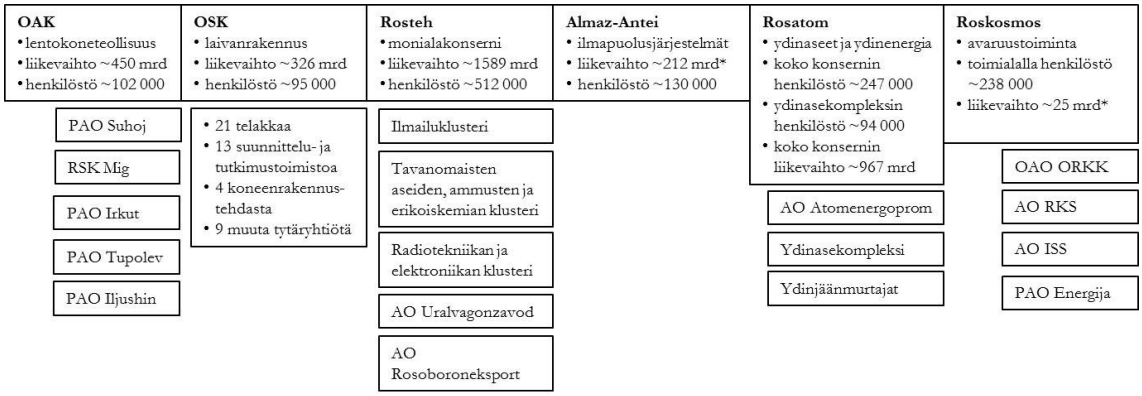

Figure 1. Largest state-owned corporations and their subsidiaries, 31 December 2017. Turnover of Almaz-Antey and Roscosmos is based on 2016 figures (marked with *).[74]

These six corporations employ a total of about 1.3 million people and they have a combined turnover of about RUB 3,570 billion. Except for Rostec, they have specialised in a small number of sectors. It should be noted, however, that all business operations of the corporations (both military and civilian products) are included in the figures and the percentage of civilian production is not known in all cases. According to SIPRI, military production has accounted for between 80 and 100% of the output in recent years.[75] Rosatom and Roscosmos are a clear exception to this rule as they generate most of their turnover in the civilian sector. However, especially in the case of Roscosmos, it is difficult to get an overall picture of company's operations and to make a distinction between the civilian and military uses of its products.

Rosatom has nuclear weapons, nuclear energy and nuclear-powered icebreakers as its business sectors. The first-mentioned business is grouped under the nuclear-weapons complex (in Russian ядерный оружейный комплекс, ЯОК), the turnover of which has not been disclosed. It is known, however, that the design and construction of

[74] ОАК 2017, Rosatom 2017, ОСК 2017, Ростех 2017, Roscosmos 2016, *Лента.ру, 21 March 2018*, Все ниже и ниже, [https://lenta.ru/articles/2018/05/21/cosmos], referred to on 15 April 2019.
[75] SIPRI 2018.

civilian nuclear power plants is the responsibility of the company AO Atomenergoprom, which had a turnover of about RUB 747 billion in 2017. As Rosatom had a turnover of about RUB 967 billion and the 'other products' accounted for about RUB 84 billion of this total, the nuclear weapons complex might have amounted to about RUB 130 billion. This also indicates that the building of civilian nuclear power plants is an important high-technology business for the corporation and Russia as a whole.

Roscosmos was established in summer 2015 so that Russia could overhaul its space activities. A series of failed launches and destroyed rockets between 2010 and 2014 is estimated to have cost tens of billions of roubles, and this was one reason prompting the creation of the new corporation.[76] Roscosmos has dozens of limited companies in its direct ownership and ORKK (in Russian Объединенная ракетно-космичесая корпорация) is probably the largest of them. Other important companies include Energija (in Russian Энергия), RKS (in Russian Российские космические системы), and ISS (in Russian Информационные спутниковые системы), which are partially owned by Roscosmos, or in which it represents the interests of the Russian government. It is estimated that the corporation and the companies coming under it have a total of about 238,000 employees and that in 2016, it had an unconsolidated turnover of about RUB 25 billion. Implementation of the space policy of the Russian Federation and the state armament programme are two of the key tasks of Roscosmos. It is responsible for the GLONASS satellite system, operations and development of the Baikonur and Vostochny cosmodromes, and international cooperation within the framework of the International Space Station (ISS).[77]

There are hundreds of smaller defence industry companies outside the large corporate structures described above, and two of them are important enough to warrant mentioning here: RTI-Sistemy and KTRV (in Russian Корпорация тактические ракетные вооружения). The first-mentioned develops and manufactures command and control systems for air and space defence, such as long-range radar systems for strategic missile troops. KTRV supplies missile weapons systems, especially for air and naval forces.[78]

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[76] *Лента.ру, 23 January 2015*, Попытка №5, [https://lenta.ru/articles/2015/01/23/federalspace], referred to on 15 April 2019.

[77] Роскосмос, *Годовой отчет 2016*, [https://www.roscosmos.ru/22444/], referred to on 29 June 2019.

[78] *Война и мир в терминах и определениях*, Данилевиц, А.А. (ed.), Издательский дом ПоРог, Москва 2016, pp. 177, 181.

As described above, the sector has been extensively consolidated over the past two decades. It was announced in October 2018 that Rostec had acquired all OAK shares, and there was public discussion on the merger of Roscosmos, Almaz-Antey, RTI-Sistemy and KTRV in spring 2018.[79]

All above-mentioned companies (except for Roscosmos, Rosatom and RTI Sistemy) are included in the list of world's top 100 arms-producing companies compiled by SIPRI. Key details of these companies can be viewed in Table 5 below. It should be noted that the turnover figures given in the table are based on the information supplied by the companies themselves and for this reason, some of the calculation methods remain unverified. They may therefore differ slightly from IFRS-based turnover figures, and thus they would not be comparable with the information presented in Chapter 3. They nevertheless give a rough idea of the actual situation.

Table 5. Russian companies on SIPRI's list of world's top 100 arms-producing companies.[80]

No.	Company	Rank SIPRI (2016)	Turnover 2017 (RUB billion)	Number of employees 2017	Ownership at the end of 2018	Main products
1	OAK	14	450	102,000	State	Civilian and military aircraft
2	OSK	19	326	95,000	State	Warships Submarines Icebreakers
3	Almaz-Antey	13	212	130,000	State	Anti-aircraft defence systems
4	Vertolety Rossii	32	230	43,330	Rostec	Military and civilian helicopters
5	KTRV	35	211	60,000	State	Missile weapons
6	Vysokotochnye Kompleksy	46	Not known	Not known	Rostec	Tactical missiles, portable anti-aircraft systems, anti-tank missiles
7	ODK	51	235	93,406	Rostec	Engines for civilian and military aircraft and space rockets, gas turbines for ships and energy generation
8	Uralvagonzavod	53	153	62,208	Rostec	Main battle tanks, other combat vehicles, railway carriages
9	KRET	54	115	39,163	Rostec	Radioelectronic systems and instruments, radars

[79] *Коммерсантъ 24 October 2018*, ОАК передана в состав «Ростеха». [https://www.kommersant.ru/doc/3779517], referred to on 15 April 2019, see also*Известия 14 March 2018,* Космос — в одни руки. [https://iz.ru/719450/dmitrii-strugovetc-aleksei-ramm-nikolai-surkov-evgenii-deviatiarov/kosmos-v-odni-ruki], referred to on 15 April 2019.

[80] SIPRI 2018; companies' annual reports.

10	Sukhoi	-	123	24,584	OAK	Civilian and military aircraft
11	OPK	57	87.2	36,797	Rostec	Communications systems, electronic warfare systems, robotic complexes
12	Irkut	-	84.6		OAK	Civilian and military aircraft

As shown, six of the twelve companies on the list belong to Rostec. After OAK's ownership arrangements have been completed, the total will reach nine. Of the largest companies, only RTI Sistemy is mainly in private ownership.

3

FINANCIAL ANALYSIS OF THE COMPANIES

The goals set by Russia's political leadership for the country's defence industry, the key policy measures, and the financing and structural arrangements introduced to meet these goals were discussed in the chapter above. In this chapter, the authors will analyse the competitiveness of six corporations on the basis of their IFRS-compatible financial statements. They will first take a look at the aircraft manufacturer OAK and the shipbuilder OSK, after which they will examine companies coming under Rostec. The chapter concludes with a summary of the financial standing and competitiveness of the companies.

3.1 OAK

Corporate structure and business operations

OAK ('United Aircraft Corporation') is a large aircraft manufacturing company owned by the Russian government. It has its head office in Moscow and its shares are traded on the Moscow Stock Exchange. OAK has Russia's most important civilian and military aircraft companies, such as MiG, Sukhoi, Irkut, Ilyushin and Tupolev, as its subsidiaries. The company was established under a decree issued by President Putin on 21 February 2006. Sergei Ivanov, Russia's Defence Minister, was appointed as the Chair of its Board of Directors, while Aleksey Fyodorov, former head of MiG and part-owner of Irkut, became the Managing Director. The company was registered at the end of November 2006 and the ownership transfer process was completed by April 2007. In 2009, the Russian government owned more than 91% of the company and in 2017, its ownership had exceeded 92%. The remaining shares belonged to Vneshekombank and private investors.[81]

OAK is working on a large number of development projects in civilian and military aviation. The best-known of the military projects is probably the fifth-generation SU-57 fighter. Modernisation of the TU-160 bombers and the design of the future PAK DA aircraft are probably the most important projects in the context of Russia's strategic nuclear deterrent. The Sukhoi SSJ-100 airliner is a major civilian project pursued by OAK and to market the aircraft, it has established a joint venture with the Italian company Leonardo. The venture, SuperJet International, is based in in the Italian city

[81] Объединённая Авиастроительная Корпорация (ОАК), *Финансовые отчетности 2013–2017*, [https://www.e-disclosure.ru/portal/company.aspx?id=11433], referred to on 15 April 2019.

of Venice. In another international joint project, OAK is seeking to develop a wide-body passenger airliner in cooperation with Chinese partners. The aircraft is provisionally known as CR929 and it is promoted by the China-Russia Commercial Aircraft International Corporation, established in 2017. OAK had been working on a joint transport aircraft project with India for many years but in spring 2017, it was announced that it would be discontinued.[82] MS-21-300 is a domestic project, in which Irkut is developing a commercial aircraft.[83]

Economic indicators

The aircraft industry has traditionally played a major role in Russia, and it has been one of the pillars of the country's arms exports after the disintegration of the Soviet Union. For example, in 2015, exports accounted for 29% of OAK's turnover and in 2016, the figure had risen to 49%. Therefore, it is somewhat surprising that OAK has been performing extremely poorly, which has manifested itself in losses, substantial debts and a low equity ratio. The company posted losses throughout the period in review (2013–2016). During the best years, net financing expenses 'only' accounted for about 50% of the operating margin, which is an indication of a heavy debt burden. In 2017, the corporation reported an operating profit of slightly less than five per cent but this could not be verified from the financial statements.

Russia's Ministry of Defence is the corporation's largest single customer and in 2016, its purchases accounted for about 43% of the turnover. In 2015, the figure had been about 47%. Between 2011 and 2016, within the framework of the state armament programme, OAK delivered about 455 combat aircraft (more than 300 fighters, about 50 strategic bombers and about 100 attack aircraft). Each year, the group has delivered between 40 and 70 fighters and a maximum of 17 strategic bombers.[84]

The most important subsidiaries of OAK and their turnover figures are presented in Table 3 below. It should be noted that unlike the other OAK subsidiaries, MiG and Ilyushin have not published IFRS-based financial statements and for this reason, their figures have been calculated using RAS as a basis. The figures are thus not fully comparable and the operating profit percentage, in particular, should be treated with caution.

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[82] *Defence.ru, 17 March 2017*, Россия и Индия свернули проект военно-транспортного самолета. [https://defence.ru/article/rossiya-i-indiya-svernuli-proekt-voenno-transportnogo-samoleta/], referred to on 15 April 2019.

[83] Объединённая Авиастроительная Корпорация 2018.

[84] Экспорт вооружений publications from the period 2015–2018, see also Объединённая Авиастроительная Корпорация 2017.

When the RAS-based income statements of MiG and Ilyushin are examined in more detail, two major differences with other subsidiaries are noted. Firstly, these companies do not have any administrative expenses, which significantly boosts their results. It is quite possible that they have relied on the administrative services provided by their parent company. Secondly, it seems there are slight differences between RAS and IFRS in the way in which expenditure is grouped. For this reason, in IFRS, EBIT has a completely different meaning than 'capital gain' in RAS. Thus, it cannot be said with certainty that MiG and Ilyushin are more cost-efficient than the other parts of the OAK corporation.

Table 6. Financial information about the main OAK subsidiaries. Figures marked with asterisk (*) are from RAS-based financial statements.

Name	Year	Turnover, RUB billion (share of OAK)	EBIT-%	Profit/loss for the period, RUB billion	Profit (loss), RUB billion
Sukhoi	2016	157.3 (38%)	1	-9.8	-63.2
	2015	135.2 (39%)	-32.4	-28.3	-53
MiG*	2016	56.6 (14%)	11.6	2.8	-53.2
	2015	42.2 (12%)	4.7	-42.9	-57.3
Irkut	2016	108.9 (26%)	1.2	1.2	5
	2015	84.5 (24%)	-2.3	-2.3	4.6
Tupolev	2016	23.1 (6%)	-0.3	0.1	-27.3
	2015	18 (5%)	-54	-12	-27.2
Ilyushin*	2016	14.3 (3%)	12.6	0.6	5.9
	2015	11.6 (3%)	26.7	1.4	6

According to some reports, because of a low order backlog, MiG has also been forced to restructure its operations by cutting workforce. For example, in summer 2017, the company laid off about 200 employees and a reduction of 500 was planned for the year 2018.[85]

Capital expenditure has remained at a fairly high level. In most years, it has been about twice as high as depreciation. At the same time, research and development expenditure has only accounted for about 0.2% of the turnover, which is an extremely low figure. It should be noted, however, that in many years, R&D has added about RUB 40 billion to the turnover, and in 2016, for example, this accounted for about 10% of the total. Furthermore, in addition to the R&D expenses entered as expenditure in the income statement, substantial R&D items have been capitalised in the balance sheet. For example, in 2015 and 2016, they totalled about RUB 12.6 and 9.5 billion, respectively. At the end of 2016, the value of these balance sheet items totalled about

[85] *Лента.ру, 1 December 2017*, СМИ узнали о сокращениях в корпорации «МиГ», https://lenta.ru/news/2017/12/01/migpersonal/], referred to on 15 April 2019.

RUB 77 billion (about RUB 83 billion in 2015). The largest single contributing factor was the SSJ-100 project (about RUB 35 billion), followed by the MS-21 project (about RUB 18 billion). 'Other projects' totalled about RUB 14.6 billion.

Such entries can only be made if the company can estimate and demonstrate with sufficient reliability that the products under development will generate economic benefits in the future. In other words, the company must have a realistic plan detailing how the product under development will be manufactured and marketed. In many cases, the company's R&D expenditure only partially meets this requirement so that it can be capitalised in the balance sheet. It seems that in OAK, nearly all development work has been included in this category. This may be an indication of a difficult economic situation, in which there are simply no incentives or funds to carry out independent research work. At the same time, it is not logical for the company to spend its own money on product development if it can obtain lower-risk funding in the form of public subsidies. In fact, the corporation has received subsidies within the framework of aircraft industry and defence industry development programmes in the form of direct funding, investment aid and interest subsidies. In 2015 and 2016, these sums totalled about RUB 8.2 and 12.5 billion, respectively.

Generally speaking, none of the companies in the corporation stands out in any particular way. In fact, Irkut is perhaps the least unsuccessful of them as it has been able to post a meagre profit on a cumulative basis. Ilyushin has also managed to the same but only because the company does not have any administrative costs in its accounts.

In Sukhoi, the largest single factor negatively affecting the results over the past two years has been the Super Jet 100 airliner project. The accident in Moscow in spring 2019 dealt a heavy blow to the project, characterised as a symbol of national pride and hope.[86] In 2015, the company had to make a substantial (about RUB 28 billion) R&D expenditure write-down in its balance sheet. Penalty fees arising from this project also created a dent of more than RUB 12 billion in the results. Thus, these non-recurring items weakened the result by a total of about RUB 40 billion, which was nearly 12% of the turnover. In 2016, the same project generated a loss of about RUB 3.5 billion, a result of inventory write-down. Details of the SU-57 project have not been itemised in the financial statements.

At the same time, by the year 2016, Irkut had already earned more than RUB 12 billion from MS-21, its most important civilian project. The assumption is, however, that this income has originated from such sources as state development funding because the

[86] Dagaeva, Anastasia: *A National Disappointment: What Went Wrong With the Sukhoi Superjet 100, 13.05.2019*, Carnegie, Moscow [https://carnegie.ru/commentary/79108], referred to on 18 June 2019.

type certification of the aircraft has been postponed to at least 2020 and type certification is a prerequisite for serial production.[87]

All in all, OAK is a surprisingly weak giant. Despite its importance and strong exports, it has been a loss-making company. Surprisingly enough, not even the substantial purchases made within the framework of the state armament programme GPV-2020 had helped to turn the losses into profits by the end of 2016. Purchases by the armed forces are unlikely to grow any further though at the same time, significant reductions are not expected either.

At the same time, however, the corporation has apparently realised that it is trouble and has announced a series of development programmes to boost productivity. Modernisation of the production technologies and rationalisation of operating practices in accordance with the new industrial model have been suggested as solutions. Under the new industrial model, design and production functions would be concentrated in specialised centres of excellence. The aim is to achieve a five-fold increase in productivity by the year 2025.[88] A lion's share of the funding has been allocated to the development programme of the Russian aircraft industry, which suggests that the Russian government considers the sector particularly important.

The MiG company has also started reducing workforce, which in a manufacturer of such a formidable reputation can be considered an important signal. It should also be noted that substantial product development inputs at least partially explain the losses incurred by OAK. If the development investments will generate the desired results and new civilian and military aircraft can be introduced, the corporation may be able to substantially strengthen its position in the long term.

3.2 OSK

Corporate structure and business operations

The OSK corporation is Russia's largest shipbuilder. The company, which is wholly owned by the state, was established in 2007. In 2017, OSK had 47 subsidiaries, among them 21 shipyards and 12 design bureaus. The company owns most of Russia's shipbuilding capacity (according to its own estimates, the figure is about 80%). Unlike the other giant OPK corporations, the geographical focus of OSK's operations lies on the western parts of Russia, especially St Petersburg, and the Archangelsk region on

[87] *Коммерсантъ, 29 November 2018*, МС-21 увяз в узлах. [https://www.kommersant.ru/doc/3813832], referred to on 15 April 2019.
[88] Объединённая Авиастроительная Корпорация (2018).

the shores of the Arctic Ocean. The Arctech shipyard in Helsinki is owned by OSK.[89]

OSK designs and builds different types of civilian and military vessels, from submarines to icebreakers. Its best-known submarine projects include the Borei-class strategic nuclear-powered submarines designed by the Rubin design bureau and built by the Sevmash shipyard (project no. 955). Originally, eight of these vessels were envisaged within the framework of GPV-2020 and three have been commissioned so far. OSK is also in the process of constructing non-strategic nuclear-powered Yasen-class submarines (project no. 885) and diesel-powered Lada-class submarines (project no. 677). The surface vessel projects for the Russian Navy include the Steregushchiy-class corvettes built at the Severnaya Verf shipyard (project no. 20380) and designed by the Almaz design bureau. The second major project involves the construction of frigates (project no. 11356) at the Yantar shipyard. Admiral Grigorovich, the first vessel of the class, was delivered to the Russian Navy in 2016. In addition to large vessels, OSK shipyards have also built dozens of smaller ships of different types.[90]

Economic indicators

Unlike the other corporations reviewed in this study, OSK has not published any notes to its financial statements since 2015, which makes it difficult to analyse the overall picture. Annual reports can be used as a basis for informed assessments but not for detailed comparisons. It should be noted, however, that OSK is the only one of the corporations examined in this report that has at least published partial financial statements for the year 2017. For this reason, the economic indicators have been calculated for the period 2014–2017.

Like most other corporations examined in this study, OSK has also been characterised by poor profitability and substantial debts during the period in review. However, when measured on the basis of gearing and equity ratio in 2014 and 2015, its situation has been even weaker than average. Moreover, its liquidity in those years has probably also been weaker than in any of the other corporations reviewed in this study (current ratio 0.6 and 0.5). In 2015, balance sheet advance payments rose from RUB 167 to 325 billion and in 2016, they reached RUB 502 billion. This pushed advance payments to nearly 60% of the balance sheet total, which is an extremely high figure (in 2017, they stood at about 55%). For comparison, the corresponding figure for OAK in 2015 and 2016 was about 26%. Improvements in liquidity and solvency in 2016 and 2017 are largely explained by generous advance payments. Moreover, in both years, the

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[89] Объединённая Судостроительная Корпорация: *Предприятия ОСК,* [https://www.aoosk.ru/companies/], referred to on 27 June 2019; *Годовой отчет 2017*, [https://www.aoosk.ru/about/disclosures/], referred to on 15 April 2019.

[90] Объединённая Судостроительная Корпорация (2017); Шеповаленко, Максим: Предварительные итоги ГПВ-2020 в части военного кораблестроения. *Экспорт вооружений, Январь-Февраль 2018*.

Russian government injected about RUB 16 billion into the corporation in the form of a share issue. It should be noted, however, that OSK reported an operating profit of 4.4% for 2017, which can be considered satisfactory in view of the extremely poor years preceding it.

In an interesting detail, penalty payments and inventory write-downs entered under 'other operating costs' for 2015 totalled about RUB 15 billion. Without these additional expenses, the operating profit would have been a reasonable 5.7%, instead of a paltry 0.3%. These costs are not detailed in the financial statements but it is a common practice that in project deliveries, such penalty payments are set out in contracts as sanctions for delays. The proportion of other expenses remained high in 2016 and 2017 but as the notes to the financial statements are kept secret, no details of them are available. However, at general level, the fact that the company has incurred substantial 'hassle costs' raises questions about such matters as the quality of project management and the management of the subcontractor chain.

When compared with the other sectors analysed in this study, shipbuilding is characterised by small production runs and long delivery times. For example, in 2017 four new warships were completed, compared with eight in 2016. For civilian vessels, the figures were 11 and 14, respectively.[91] This probably explains some of the substantial annual fluctuations in the cash flow from operations: in the period in review, this figure has been well below zero in some years (2014 and 2017), while in some years it has been well above zero (2015 and 2016). Concentration on the domestic market has been the second feature characterising OSK: in 2017, exports only accounted for 6% of the turnover (in 2016, the figure had been 12%). This business logic partially explains the substantial need for advance payments.

With regard to capital expenditure, OSK seems to be on a healthy basis: except for one year, it has been at least 1.56 times higher than depreciation. At the same time, however, R&D investments have been zero and the R&D items capitalised in the balance sheet in 2014 and 2015 have also been negligible. The situation may, of course, have improved after 2015.

As a whole, OSK has been a modest performer even though the trend would seem to be upwards. Shipbuilding has only accounted for between six and seven percent of Russia's arms exports, which shows how completely the sector relies on domestic sales.[92] This puts the shipyards in a difficult position, especially if they want to become less dependent on the state budget.

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[91] Объединённая Судостроительная Корпорация (2017).

[92] Juola et. al (2019), p. 85.

When orders and funding are considered, it should be remembered that shipbuilding was given a high priority in the allocation of funding within the framework of GPV-2020: development of the Russian Navy originally accounted for about one quarter of the state armament programme. There has been strong criticism of the sector, and it has been levelled at such matters as inefficiency and outdated production machinery. With the occupation of the Crimea and the sanctions imposed in the aftermath of the Ukrainian crisis, Russian shipyards found themselves in a 'diesel crisis' as the imports of many key components were stopped.[93] In a shipyard accident in the Murmansk region in autumn 2018, a floating dock (said to be Russia's largest) sank during the overhaul of the aircraft carrier Admiral Kuznetsov. The accident was caused by a technical failure.[94] It is clear that one should not make conclusions of the entire sector on the basis of a single event. Nevertheless, the failure of such an important maintenance system at a critical moment raises wider questions about the state of the overall service infrastructure.

3.3 Rostec

Structure and business operations

Rostec is the multi-sector giant of Russia's defence industry and over the years, a large number of companies and sectors have been incorporated into it. The corporation was established on the orders of President Putin on 23 November 2007, and its CEO Sergey Chemezov has become one of the most important figures in Russia's defence industry and in the country's industries in general. Chemezov and Putin have known each other since the 1970s when they both worked for the KGB in Dresden in what was then the German Democratic Republic. At the time, Chemezov was a Soviet intelligence officer tasked with spying on Western high technology secrets.[95] In an interesting feature, Chemezov is the only one of the OPK's chief executives that has a permanent seat in the VPK chaired by the President.[96]

Rostec is perhaps the most visible example of the prevailing state-controlled industrial policy that has resulted in the creation of vertically integrated structures. In its early years, the corporation comprised more than 400 companies but by the end of 2017, the total had exceeded 700. However, because of its multi-sector structure and huge size, there is no point in examining Rostec as a single company. Rather, it is a cluster of companies producing a broad range of different products, from combat helicopters

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[93] Шеповаленко, Максим: Предварительные итоги ГПВ-2020 в части военного кораблестроения. *Экспорт вооружений, Январь-Февраль 2018*, see also Juola et. al (2019), pp. 86–87.

[94] *Лента.ру, 30 October 2018*, Крупнейший в мире плавучий док затонул во время ремонта «Адмирала Кузнецова». [https://lenta.ru/news/2018/10/30/pd50], referred to on 15 April 2019.

[95] Myers, Steven L.: *Uusi tsaari, Vladimir Putin ja hänen Venäjänsä*, Bazar, 2018, p. 117.

[96] Президент России (2019).

to missiles, and from medical imaging devices to electrical vehicles. As shown in Figure 1 in Chapter 2 above, the corporation comprised four clusters and a number of separate holding companies at the end of 2017.

The engine manufacturer ODK and the helicopter manufacturer Vertolety Rossii are two of the companies coming under the aviation cluster. The KRET group (in Russian Концерн радиоэлектронные технологии) manufacturing radio electronics is also an important Rostec subsidiary.[97]

The cluster of companies manufacturing conventional weapons, ammunition and special chemical products includes Tehmash (ammunition), Kalashnikov (handguns), Vysokotochnye Kompleksy (high-precision weapons and missiles) and the Splav group (multiple launch rocket systems).[98]

Roselektronika is by far the largest holding company in the radiotechnology and electronics cluster. The previously independent Objedinjonnaja pribostroitelnaja korpotatsija ('United equipment manufacturers') was incorporated into Roselektronika in 2017. Roselektronika's products include communications and command systems, semiconductor technology, electronic warfare equipment and robotic systems. Shvabe is another major group in the cluster. It produces optoelectronic systems and lasers for both civilian and military purposes. The Avtomatika group is a specialist in cyber security and encrypted communications systems.[99]

A number of companies have also been incorporated into Rostec as independent entities, and the best-known of them is probably Uralvagonzavod, a manufacturer of main battle tanks and railway equipment. After running into serious economic difficulties, this venerable company was merged into Rostec in 2016.[100]

In addition to the above-mentioned companies, Rostec also comprises more than 20 directly controlled strategic companies. These include Kamaz (lorry manufacturer), Rosoboronexport (state-owned weapons exporter), VSMPO-AVISMA (internationally important titanium producer), Neftegazavtomatika (supplier of automation systems for liquefied-gas production plants), and even a combinate in Kaliningrad producing amber.[101]

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[97] Росгех (2017).
[98] ibid.
[99] ibid.
[100] ibid.
[101] ibid.

Case: Kalashnikov

The name Kalashnikov is probably known to most people for the AK-47 assault rifle, perhaps the most famous handgun of the world. In 2016, with a market share of 54%, the company was the Russian market leader in civilian handguns, and the same year, it accounted for more than 90% of Russia's handgun production. Kalashnikov exports its products to about 30 countries.[102] .

Kalashnikov is proud of its long and venerable traditions and the company can trace its history to 1809. That year, an arms factory was established in the town of Izhevsk on the orders of Tsar Alexander I. The production of the Kalashnikov assault rifles began in 1949.[103] The Izhmash manufacturing company, established in 1975, remained operational until 2011 when economic problems forced it into liquidation. A restructuring process followed and two years later, Rostec, which owned Izhmash, renamed the company Kalashnikov. In 2014, Rostec sold 49% of the new group to Transkomplektholding, a company owned by three private individuals, in which Aleksey Krivoruchko was the largest shareholder (50%). It was reported in spring 2018, that Rostec had sold another 26% of its shares to the same investment company. Rostec retained a controlling interest in the company giving it veto power over important decisions. In Russia, this means 25% of the share capital plus one share.[104]

In Rostec's portfolio, Kalashnikov, with a workforce of less than 6,000, is a small player but there are a number of factors making it more important than its size would suggest. First of all, it has been presented by Russia's political leadership as a model for cooperation between private investors and the state in defence industry matters. Within a few years, Kalashnikov was transformed from a loss-making crisis company into a success story, and it is cited as an example of the results achieved through a government-led industrial policy.[105] It has diversified its production by acquiring new businesses, and in this way it has systematically put into practice the diversification strategy promoted by Russia's leaders. In addition to handguns, Kalashnikov also manufactures unmanned aerial vehicles (UAV), small assault boats, and weapons system modules for vehicle platforms.

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[102] Калашников, *Финансовые отчетности 2014–2016*, [http://www.e-disclosure.ru/portal/company.aspx?id=29973], referred to on 15 April 2019, 2016.

[103] ibid.

[104] *РБК, 15 February 2018*. «Ростех» продал 26% акций «Калашникова» частному инвестору. [https://www.rbc.ru/politics/15/02/2018/5a8474b39a7947e5adcc450f], referred to on 15 April 2019.

[105] *Коммерсантъ, 25 August 2017*, «Предприятия должны работать в условиях снижения гособоронзаказа», Глава Минпромторга Денис Мантуров о переменах в работе оборонно-промышленного комплекса. [https://www.kommersant.ru/doc/3391908], referred to on 15 April 2019.

Secondly, in spring 2018, Aleksey Krivoruchko, the company's Managing Director, was appointed Russia's Deputy Defence Minister with responsibility for armament and arms industry. In the same connection, he also had to give up his ownership in Kalashnikov. As part of the reshuffle, Dmitry Rogozin, the long-serving Deputy Prime Minister was replaced by Yury Borisov and was appointed as the CEO of the Roscosmos corporation. In some Western comments, these moves were seen as strengthening the already strong position of Sergey Chemezov, Rostec's CEO.[106]

In terms of his expertise and experience, Krivoruchko can be considered as a stranger in the Ministry of Defence as he has a background as a businessman.[107] Between 1999 and 2006, he worked in the civilian aircraft industry and as the technical director of the Aeroflot airline. From 2006 to 2009, he worked in similar tasks in the AvtoVAZ vehicle-manufacturing company, and in 2010 he was appointed as the Managing Director of Aeroexpress, the operator of airport rail link services in the Moscow area. Finally, in 2014, he became the largest private shareholder in Kalashnikov and the company's Managing Director and from this task, he moved to his present post in the Ministry of Defence.[108]

His appointment to a high ministerial post may be a sign of a power play but also a modest indication that the Ministry of Defence wants to acquire new expertise and understanding of the way in which businesses operate. It remains to be seen how he will succeed in this task.

Economic indicators

The key economic indicators published by Rostec and collected from the company's report on operations are shown in Table 7. It should be noted that Rostec has selected the figures that it wants to present to investors, decision-makers and the public at large and for this reason, it is difficult to make any far-reaching conclusions on their basis. Moreover, it has not been stated which standards have been used in the calculation of the figures, which means that direct comparisons with other companies cannot be made. Interestingly enough, at least some of the figures for subsidiaries are substantially higher that what the subsidiaries themselves have reported in their own IFRS-based financial statements. For example, the engine manufacturing company ODK posted a turnover of RUB 190 billion and 177 billion for 2016 and 2015, respectively. The figures given by Rostec are RUB 223 billion and 212 billion, respectively. The difference may be explained by the differences between RAS and IFRS.

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[106] Boulegue, Mathieu: Russia's Shifting Defense Establishment. *National Interest, 24 June 2018*. [https://nationalinterest.org/feature/russias-shifting-defense-establishment-26711], referred to on 15 April 2019.
[107] ibid.
[108] *РБК 15 February 2018*.

Table 7. Economic indicators taken from Rostec's annual reports.[109]

	2017	2016	2015
Turnover (RUB million)	1,589	1,266	1,140
Change in turnover from previous year (%)	25.5	11.1	
EBITDA (RUB million)	305	268	253
EBITDA margin (%)	19.2	21.17	22.19
Profit for the period (RUB million)	121	88	99
Profit for the period (%)	7.6	7.0	8.7

In addition to the figures shown in the table, Rostec has reported that in 2008 (the year the corporation was established), a total of 148 of its more than 400 companies were crisis companies, 28 were in liquidation, 17 did not have any business operations and the corporation posted a combined loss of RUB 64 billion. Between 2010 and 2017, the average salary in the corporation rose from about RUB 20,000 to about RUB 47,000, an increase of about 135%. During the same period, the inflation rate in Russia was 'only' about 77%. This means that both in real and relative terms, there has been a substantial rise in wages and salaries at Rostec over the past ten years.

Concerning the turnover, it should be remembered that companies have been continuously incorporated into Rostec, which means that one cannot talk of organic growth (growth based on corporate acquisitions). There is no doubt that an operating margin exceeding 20% is high but when taken out of context, this indicator is sensitive to manipulation. When at the same time, the EBIT figure has not been published, the suspicion arises that Rostec wants to hide its problems (such as a high debt to equity ratio) by giving an excessively positive picture of itself. On the other hand, the profit of 7.6% for the 2017 financial year should be considered as reasonable,[110] and suggests that the corporation also has genuinely profitable subsidiaries. As no financial statements are available, it is unfortunately impossible to reliably estimate the accuracy of the figures or what lies behind them.

The above figures give at least a rough idea of the corporation's finances, irrespective of whether or not they are deemed as accurate. Thus, it seems that Rostec has managed to considerably strengthen its financial position. At the same time, this is not particularly surprising given the massive armament programme of the 2010s. It has been claimed that as the largest operator in the sector, Rostec has secured up to one quarter of the contracts allocated within the framework of the yearly state defence

[109] *Росмех 2018, 2017.*

[110] *Talouselämä, 1 June 2018*. 500 Suomen suurinta yritystä. For comparison: the profit of the Finnish company Patria stood at 6% in 2016.

order.[111] It is clear that a funding injection of such size is also reflected in the corporation's profits.

3.3.1 Vertolety Rossii

Structure and business operations

Vertolety Rossi is one of the world's largest helicopter manufacturers. According to some reports, it controls 10% of the global helicopter markets, which makes it the world's fourth largest supplier of rotor-winged aircraft.[112] The corporation was established in 2007 and it designs, produces and maintains civilian and military helicopters. Its main production plants are located in Rostov-on-Don (Rostvertol), Kazan, Ulan-Ude and Arsenyev. The corporation's most important design bureaus still carry the names of their founders (Nikolai Kamov and Mikhail Mil) and the best-known helicopter ranges (Ka and Mi) are also named after the two.[113] The corporation has also entered into a joint venture (Helivert) with the Italian company Leonardo. Established in 2009, it is responsible for the final assembly and marketing of the medium-sized AW139 helicopter in Russia.[114]

Economic indicators

Vertolety Rossii is the only one of the corporations reviewed in this study that has posted at least satisfactory figures when examined on the basis of the indicators used in this report. In fact, in terms of profitability, its performance is excellent. The average return on capital employed between 2013 and 2016 was an impressive 18%. In terms of the debt ratio, the corporation is also in a class of its own: at most, its net financing expenses were 17% of the operating margin, which is much less than in most other corporations examined in this study. In gearing and equity ratio, the corporation's performance was between satisfactory and good, which is also an excellent achievement when compared with the other corporations.[115]

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[111] Bukkvoll, Tor; Thomas Malmlöf & Konstantin Makienko: *Post-Communist Economies, № 2 (29) 2017*, pp. 232–249.

[112] *Press release of Airbus Helicopters 23 January 2019*, [https://www.airbus.com/newsroom/pressreleases/en/2019/01/airbus-helicopters-sees-strong-sales-increase-in-2018.html], referred to on 15 April 2019.

[113] Вертолёты России, *Структура холдинга*, [http://www.russianhelicopters.aero/ru/about/structure], referred to on 15 April 2019.

[114] *Presentation of Helivert*, [https://www.helivert.aero/about], referred to on 15 April 2019.

[115] Вертолёты России, *Финансовые отчетности 2013–2016*, [http://www.russianhelicopters.aero/ru/investors], referred to on 15 April 2019.

An estimated total of 685 helicopters were delivered within the framework of GPV-2020 between 2011 and 2016.[116] The assumption is that they were all supplied by Vertolety Rossii. Annual deliveries have varied between 100 and 120.[117]

Sales of new helicopters accounted for about 77% of the corporation's turnover in 2016, and the remainder came from maintenance services. In 2015, the figures had been about 80% and 17%, respectively. It is interesting to note that Vertolety Rossii is also a major exporter: in 2016, the domestic market accounted for 35% of the sales, which means that it came second after exports. Africa was the largest single market, accounting for 40% of the sales. It was followed by Asia (about 19%). In 2015, the breakdown had been as follows: Russia 29%, Asia 34% and Africa 24%.[118]

In capital expenditure and especially in R&D, the corporation has also performed significantly better than the other companies reviewed in this study. In the peak years, it has invested almost two per cent of its turnover in research and development. This has been mainly due to profitable business operations, in which global exports also play an important role. A company with solid finances can also invest in the future. At the same time, Vertolety Rossii has also received state aid. When the intangible balance sheet assets are examined, it can be noted that capitalised development expenditure totalled about RUB 25.3 billion between 2013 and 2016, while state aid amounted to about RUB 8.1 billion during the same period. The corporation would, however, also manage quite well without such aid.

All in all, Vertolety Rossii can be considered as the strongest of the corporations reviewed in this study and it also provides Russia with much needed export revenue.

3.3.2 Kalashnikov

The history of Kalashnikov, including name changes and corporate restructurings, was discussed above. Izhmash, its predecessor, had reached a crisis point in the year when it went into liquidation: its output fell by almost 50% and it posted a loss of RUB 2.43 billion.[119]

The sanctions imposed by the West in summer 2014 hit Kalashnikov hard because the United States accounted for about 40% of its total sales, making it the second-largest market after Russia. The company responded to the crisis by taking a range of

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[116] Juola et. al (2019), p. 77.
[117] Экспорт вооружений 2017.
[118] Вертолёты России 2017
[119] *Лента.ру, 6 April 2012* Производителя автоматов Калашникова признали банкротом, [https://lenta.ru/news/2012/04/06/bankrupt], referred to on 15 April 2019.

efficiency-boosting measures, by acquiring new businesses and by improving its service culture. In addition to arms, Kalashnikov also started to sell and lease its brand and to build a consumer-driven service network.[120]

Judging from economic indicators, the efforts have produced results and the company was able to improve its performance in the period 2014–2016. After suffering a heavy operating loss of RUB 3.5 billion, the company was able to post a profit of more than RUB 3 billion, and the losses of about RUB 200 million for the financial year were followed by a profit of RUB 2.3 billion. In a lucky coincidence, the company seems to have benefited from a weak rouble during the two most difficult years because in 2015 and 2016, its financial performance improved by about RUB 2.3 and 3.4 billion, respectively, as a result of exchange rate differences. This was possible because most of the company's expenses are in roubles.[121]

Because of the losses accumulated during 2014, the company's equity went about RUB 500 million into the red, pushing the equity ratio to -12.6%, an alarming figure. By the end of 2016, the company had managed to boost its equity by nearly four billion roubles. Advance payments totalling more than six billion roubles also seem to have played an important role in the company's struggle for survival. It was probably the advance payments that allowed Kalashnikov to launch a sizeable capital expenditure programme, in which it spent about RUB 1.4 billion on fixed assets in 2015 and about RUB 3.5 billion in 2016. The company also took out new loans totalling nearly six billion roubles from such institutions as Sberbank.[122]

Even though the company was able to recover from its losses and post a profit in 2016, the operating cash flow still showed a minus of about RUB 570 million. However, this is mainly explained by a transfer of substantial advance payments (nearly RUB 7 billion) to the company's account. When measured on the basis of gearing and equity ratio, Kalashnikov is still burdened with substantial debts but it seems to be going in the right direction.[123]

The company has not posted any research or development expenditure, while at the same time, the R&D item entered in intangible balance sheet assets totalled nearly RUB 25 million in 2016. It should be noted, however, that this is only a fraction of the total intangible assets of about RUB 1.3 billion.[124]

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[120] *New York Times, 6 June 2016*, Kalashnikov, Maker of AK-47, Looks to Rebrand.
[121] Калашников, *Финансовые отчетности 2014–2016*, [http://www.e-disclosure.ru/portal/company.aspx?id=29973], referred to on 15 April 2019.
[122] ibid.
[123] Калашников 2017
[124] ibid.

As a whole, it would thus seem that Kalashnikov has got through the worst part of the crisis and is now slowly recovering. It is too early to tell whether the corporation is now on a sustainable growth path but the measures already introduced are probably taking it in the right direction. Government support and a professional approach to management have pulled the company out of its economic tailspin, and Kalashnikov is now able to develop its operations by making investments, by diversifying its production and by revising its business models.

Can this potential recipe for success be copied by other parts of OPK? This is what many decision-makers seem to hope and believe. Everything is possible, but it is easier said than done. First of all, Kalashnikov has been able to rely on a clearly defined and well-recognised product category with a large number of users (handguns), which can be marketed globally for both civilian and military purposes. Combined with an extremely well-known brand, this has probably allowed Kalashnikov to develop its business operations in a more flexible manner compared with most other Russian defence industry companies. Secondly, Kalashnikov is relatively small, which means that it has been easy for the Russian government to inject capital into the company or to lend money to it during crisis periods. This is probably also the reason why the company has been able to attract domestic private investors as owners. It might have been difficult for substantially larger companies to obtain the necessary funding. Thirdly, development and change management is also easier in a small company than in a giant conglomerate.

3.3.3 ODK

Structure and business operations

The engine-manufacturing corporation ODK develops, builds and maintains engines and associated systems and components for aviation, shipping, space and energy industry. It supplies products for both civilian and military use. ODK's products include engines and propulsion systems for aeroplanes, helicopters, ships and launch vehicles, and gas turbine units for the generation of electricity and thermal energy. OAK, Vertolety Rossii, Rosatom, Roscosmos and Gazprom are among the corporation's major domestic customers. The Ufa Engine Industrial Association UMPO (in Russian Уфимское моторостроительное производственное объединение) located in the city of Ufa is ODK's largest subsidiary. [125]

Important military development projects in recent years have included the engines for the SU-57 fighter aircraft and the TV7-117 product family. The latter is a range of turboprop engines intended for light transport planes and helicopters. The PD-14

[125] *Presentation of ODK*, [https://www.uecrus.com/rus/corporation/about], referred to on 15 April 2019.

turbofan designed for the MS-21 aircraft and the Sam146 engine produced by the Franco-Russian joint venture PowerJet are examples of the corporation's civilian projects. In PowerJet, ODK has partnered with the French multi-sector group Safran, and the engine in question is intended for the Sukhoi SSJ-100 airliner.[126]

Economic indicators

In the light of the 2014 figures, ODK could, like many other OPK companies, be characterised as a loss-making and heavily indebted crisis company. However, the company was able to substantially boost its operating efficiency in 2015 and its operating profit rose to almost 20%. Compared with the figure of 2.3% for 2014, this was a substantial improvement. Significant improvements in productivity were achieved: during the two-year period, turnover went up by about a quarter, while production costs only grew by slightly more than three per cent. The domestic market accounted for about 70% of the turnover in 2016. China was the most important export market, accounting for 17.5% of the sales. In 2015, the figures had been 65% and 18%, respectively. India accounted for about 11% of the corporation's sales. In an interesting feature, Rostec-internal sales accounted for about 58% of the sales in 2016, while in 2015, the figure had been about 44%.[127]

ODK also publishes the figures for its most important subsidiaries, and according to this information, UMPO accounted for about 38% of the corporation's turnover in 2016 but for two-thirds of the operating profit and for more than 90% of the profits for the year. The performance figures for 2015 were similar, and thus there is every reason to call UMPO the most productive and efficient part of the corporation.

Financing expenses played an important role in the corporation's expense structure and accounted for about 29% of the operating margin in 2016 and for as much as 43% in 2014. Substantial financing expenses also arouse from exchange rate differences, which probably resulted from the operations of the subsidiaries in France and the Netherlands.

ODK's equity ratio has been extremely low and it was only turned positive in 2016, partially with the help of an additional investment of about RUB 19 billion by the parent company Rostec. The extremely low equity ratio also explains the artificially high return on capital employed in 2015 (20%). Because of a negative equity ratio, gearing was also negative in 2014 and 2015.

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[126] *Presentation of Powerjet*, [https://www.safran-group.com/media/sam146-engines-worlds-coldest-city-2016-0720], referred to on 15 April 2019.

[127] Объединенная двигателестроительная корпорация (ОДК), *Финансовые отчетности 2014–2016* [http://www.e-disclosure.ru/portal/company.aspx?id=27324], referred to on 15 April 2019.

It is noteworthy that despite its financial problems, the corporation has continuously modernised its production equipment, which is a prerequisite for continuing and developing operations in the long term. The corporation has also engaged in research and development work, which has been in modest scale but nevertheless more extensive than the R&D carried out by the other companies examined in this study. It should be remembered, however, that the capital expenditure and the R&D have been funded with direct or indirect state subsidies, which means that lessening dependency on government orders will also be a problem in the future.

3.3.4 Uralvagonzavod

Structure and business operations

Uralvagonzavod started as a manufacturer of railway carriages in the city of Nizhny Tagil in the Sverdlovsk region in 1936. The company still produces railway vehicles but internationally it is best known for main battle tanks and other armoured vehicles. In addition to railway carriages, Uralvagonzavod also produces other vehicles for civilian use, such as lorries, trams and excavators. The corporation comprises more than 40 design bureaus, production plants and research organisations. The T-34 and T-55 tanks have been among the best-known products of Uralvagonzavod over the decades. The new Armata product family has been one of the most visible development projects of the corporation in recent years, and of its members, at least the prototypes of the T-14 main battle tank and the T-15 infantry fighting vehicle have been shown in public. Moreover, several existing models, such as T-72 and T-90 have been upgraded in the 2010s within the framework of the state armament programme.[128]

Economic indicators

Uralvagonzavod is a clear underperformer among the corporations examined in this study and, unlike the other companies, it failed to make improvements in any of the sectors discussed in this report during the period in review. It accumulated losses and substantial debts throughout the period 2013–2016, and military materiel accounted for about 71% of its turnover in 2016 (compared with 66% in 2015). Exports accounted for 53% (36% in 2015) of this total and the remaining 47% was generated by domestic sales. The supply of about 1,000 modernised T-72 main battle tanks between 2012 and 2016 has been by far the largest delivery made by Uralvagonzavod within the framework of GPV-2020.[129]

The company is saddled with huge debts, as clearly shown by a gearing of about 400% and an equity ratio of less than 15% in 2016. In 2016, financing expenses accounted

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[128] *Presentation of Uralvagonzavod*, [http://uralvagonzavod.ru/company], referred to on 15 April 2019.
[129] Экспорт вооружений 2016, 2017.

for 55% of the operating margin; a year before, the figure had stood at 142%.

It has been reported that the corporation was plunged into a crisis in 2012 as the demand for new railway carriages collapsed. According to Uralvagonzavod itself, its logistics-sector customers decided to extend the useful lives of their rolling stock by several years, which led to a rapid fall in sales. In addition, weakening of the rouble's exchange rate and rise in interest rates substantially weakened the company's financing position.[130] Indeed, based on the financial statements, financing expenses in 2014 and 2015 were about RUB 12-13 billion higher than in 2013, which was enough to push the corporation well into the red in the financial year.

In 2016, the Russian Ministry of Economic Affairs prohibited transport operators from using outdated rolling stock, and as a result, Uralvagonzavod started receiving new orders again. This was, however, too late to secure the company's independence because the then Deputy Prime Minister Rogozin had already turned to President Putin, proposing that the corporation should be transferred under Rostec so that its economic problems could be sorted out. This was also done and the following year, UVZ was incorporated into Rostec and it became one of its many subsidiaries. Uralvagonzavod was also one of the companies that concluded an agreement with the Russian government in December 2016, under which the state agreed to repay some of its debts.[131]

According to a number of analysts, the problems concerning the railway equipment were the main factor causing the near collapse of Uralvagonzavod. After it had been acquired by Rostec, the company's management was replaced and the loss-making logistics subsidiary was sold as part of efficiency-improvement measures. At the same time, deliveries made within the framework of the state defence order have been profitable throughout the period in review even though the profit margin has been low (between 0.5 and 2%). The whole corporation is expected to become profitable during 2018.[132] According to Rostec's annual report, Uralvagonzavod still posted a loss of RUB 3.4 billion in 2017, which would nevertheless be substantially less than the loss of RUB 5.3 billion for 2016. However, the calculating principles used by Rostec were not known at the time of the writing of this report, and thus the figure cannot be considered entirely reliable.

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[130] *Ведомости, 6 March 2018*. Как «Уралвагонзавод» оказался на грани банкротства и что его спасло. [https://www.vedomosti.ru/business/articles/2018/03/06/752833-uralvagonzavod], referred to on 15 April 2019.

[131] ibid.

[132] ibid.

All in all, according to the financial statements available, Uralvagonzavod has been in extremely poor financial shape for most of the 2010s and there has been no turn for the better. At the same time, however, repayment of the debts connected with the state defence orders has probably provided the corporation with substantial leeway and a chance to make a fresh start (at least in part). It is noteworthy that despite the crisis, the corporation has continued to modernise its production facilities, which is a prerequisite for future growth. It has been reported that under Rostec, Uralvagonzavod has also been able to enhance the profitability and operating prerequisites of its civilian production. It is clear that the corporation is such an important arms supplier that it will be kept operational, regardless of its profitability.

3.4 Summary of the companies' financial situation

In overall terms, the financial situation of the companies reviewed in this study can be characterised as weak but steady. The low point following the disintegration of the Soviet Union has probably been reached and the industry has been pulled out of the tailspin accompanying the collapse. When compared with the extremely poor starting point ten years ago, the situation can be characterised as at least reasonable. Firstly, the profitability of most of the corporations is still weak or no more than fair but the trend would seem to be gradually upwards. Secondly, in terms of solvency, most of the companies have been able to reduce their debts to more tolerable levels, even though nearly all of them are still heavily indebted. In this connection, it should be remembered that the elimination of debts totalling about RUB 800 billion by the government in December 2016 is not yet shown in 2016 figures. It should be noted, however, that the combined total of the interest-bearing debts accumulated by the six companies concerned stood at about RUB 1,000 billion at the end of 2016, and thus the debt burden of the sector has been substantially higher than the assistance provided by the state. It is clear, however, that the debt relief of RUB 800 billion has helped many corporations to substantially reduce their debt servicing costs. For example, halving the financing expenses of OAK would have transformed a loss of RUB 4.5 billion into a profit of about RUB 10 billion in 2016. Likewise, instead of posting a loss of RUB 5.3 billion, Uralvagonzavod would have shown a profit of two billion roubles. Thirdly, liquidity in all corporations is at a level that can be deemed adequate, considering the operating environment. The Russian government can be assumed to bail out the corporations in any liquidity crisis, and for this reason, they are probably prepared to operate with slightly lower liquidity that would be possible for purely market-based operators.

In a clearly positive signal, the rate of capital expenditure is high and in many of the companies, it has substantially exceeded depreciation. Admittedly, most of the capital expenditure is debt-driven and based on government money but modernisation of the production machinery is also a prerequisite for profitable business operations and

provides a basis for future growth. This is particularly important for defence industry companies against the background of a weak starting point in the early 2010s.

Relatively low inputs into research and development can be considered a negative factor in view of the future. Only two of the corporations reviewed in the study (Vertolety Rossii and ODK) have been able to invest more than one per cent of their turnover in R&D. For others, the figure is zero or only slightly above it. For example, in Airbus and Saab, the corresponding figure for 2015 and 2016 varied between 4.5 and 5.5%, while in Patria and Insta, two Finnish companies, R&D to turnover ratio in 2017 was 2.0 and 3.6%, respectively.[133]

Subsidies channelled through federation-level development programmes provide the companies with some leeway but at annual level, this funding is unlikely to give the recipients any significant competitive edge. An exception to this is the aircraft industry, for which a total of almost RUB 80 billion has been allocated within the framework of the current programme. This is ten per cent of the combined turnover of OAK, Vertolety Rossii and ODK. This can be considered as a substantial injection.

Interestingly enough, most of the OPK companies have, however, generated income through sales of research and development services. A large part of this funding has probably come from the armament programme GPV-2020. Such an operating model may well work when military equipment is developed, especially if budget funding can be guaranteed for several years at a time. At the same time, however, it is questionable whether such a model can provide a basis for developing new and innovative products that would attract orders in civilian and export markets. Typically, product development directly ordered and paid for by the customer and taking place within the framework of a project is based on the customer's requirements, which can be highly specific. This does not necessarily encourage manufacturers to engage in independent development work or to seek new customers or markets but to adhere to existing customer relationships and products.

There is one company standing out in the group. According to all indicators, Vertolety Rossii achieves at least satisfactory levels, while its profitability is excellent. It is the only one of the reviewed companies for which exports generate more revenue than domestic sales and which would probably manage on its own, even in the short term. Strong export performance is probably the main factor behind the solid finances and the higher-than-average R&D inputs.

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[133] *Tekniikka & Talous, 4 June 2018*. T&T selvitti suurimmat t&k-yritykset: tässä 100 suurimman lista. [https://www.tekniikkatalous.fi/talous_uutiset/t-t-selvitti-suurimmat-t-k-yritykset-tassa-100-suurimman-lista-6727849], referred to on 15 April 2019.

How do Russian companies compare with Western counterparts? Economic indicators of the pan-European Airbus consortium and the Swedish Saab group are shown in Appendix 1.[134,135] Three things stand out in the comparisons. Firstly, the two Western companies have a significantly higher turnover-to-employee ratio than the Russian corporations. For example, at Saab, turnover per employee (conversion factor 10) amounted to about EUR 180,000 in 2016, while at OAK, the figure was about EUR 66,000 (conversion factor 65). Moreover, unlike OAK, Airbus is a global player in its sector. Secondly, Airbus and Saab spend many times more on R&D than the OPK corporations examined in this study. Thirdly, it should be noted that in terms of profitability, the Western companies are not cash cows for their owners either. Admittedly, this is fairly typical of a mature and capital-intensive industrial sector characterised by projects of long duration. As a whole, the differences between the Russian and Western companies referred to above can be summed up by saying that the Western companies are profitable and financially healthy, and have a sound operating basis. The Russian companies on the other hand are only recovering from the depths of a financial-technological crisis and need strong government support so that they can get on their own feet. They have started from way behind, which means that they have more potential to enhance productivity by using existing manufacturing technologies than Western companies. It remains to be seen whether they are able to do this in the long term.

[134] Airbus: *Financial Statement 2015–2016*, [https://www.airbus.com/investors/financial-results-and-annual-reports.html], referred to on 15 April 2019

[135] Saab Group: *Financial Statements 2015-2016*, [https://saabgroup.com/investor-relations/reports/],referred to on 15 April 2019

4

CONCLUSIONS

4.1 Findings

Despite the many problems it is facing, Russia's defence industry is now in a significantly better shape than at the start of the 2010s. With the funding provided under the state armament programme 2020, the industry is now recovering from the low point following the disintegration of the Soviet Union, and it has been able to upgrade its manufacturing processes, and restart serial production, especially in the field of modernised weapons systems. The industry has been able supply products for both domestic and export markets, which may not have been possible ten years ago because of limited production capacity. Modern weaponry now accounts for a substantially higher proportion of the armed forces equipment than in the past and Russia may achieve the government-set target under which 70% of the materiel should be up to the latest standards by the year 2020. Between 15 and 20% of the state defence order has been channelled to R&D work each year, which has definitely provided a substantial boost for the development of weapons technology. As a whole, Russia has substantially enhanced its military-industrial production capacity over the past ten years.

At the same time, however, strengthening of the production capacity has not been reflected in the companies' financial position as many of the companies still seem to have problems, especially with profitability and solvency. In most of the corporations analysed in this report, losses accumulated over the years have eaten away a substantial proportion of their equity. The companies have invested between zero and less than two per cent of their turnover in product development, which is an extremely low figure for a high-technology sector. The support funding channelled through federation-level development programmes provide the companies with some additional leeway and room for capital expenditure but at annual level, the funding is probably inadequate to give them a decisive competitive edge (except for the aircraft industry). The government decision at the end of 2016 to repay debts totalling RUB 800 billion has eased the situation in the sector by substantially reducing the companies' financing expenses. However, it will not solve the problems arising from poor operational profitability and low productivity.

The sector is highly dependent on state budget appropriations and the number of private investors is small. In a telling example, when Deputy Defence Minister Yury

Borisov suggested in early 2018 that OPK companies should raise funds in private markets through share issues, heads of important defence-industry corporations rejected the idea, citing economic and security concerns.[136] Many of the institutional problems, such as corruption and intellectual property rights, remain unsolved. The expectations that Russian defence industry companies would become profitable global actors attracting investors have not materialised. [137].

The goal of substantially increasing commercially successful civilian production set by the Russian government seems to be much more difficult to achieve than producing new military equipment. Moreover, wider foreign policy developments such as the sanctions imposed by the West, Russia's gradual isolation from the West and the state-directed attempts to achieve self-sufficiency by substituting imports with domestic production are in conflict with the diversification strategy and the efforts to reduce dependency on state budgets.

That said, there may well be success stories within OPK in the coming years. Vertolety Rossii shows that this can be achieved. Substantial support channelled to the aircraft industry, combined with extensive development inputs may well produce results in the long term. When correctly implemented, the new pricing system for military materiel may provide a basis for substantial productivity improvements. International joint ventures with such partners as China can help Russian companies to find new sources of funding and investments independent of the West. These signs and developments should be closely monitored in the coming years.

4.2 Limitations on the study and topics for further research

Relying on a relatively small number of financial statements, most of which are by aircraft manufacturers and shipbuilders, has been the key limitation faced by the authors. For example, because of inadequate source material, they have not been able to analyse companies in electrical, electronics or information technology industries. Secondly, the authors have focused on the highest tiers of the large state-owned industrial corporations, which may have hidden the potentially substantial differences between their subsidiaries. Thirdly, the analysis mainly concerns economic indicators contained in the financial statements without connecting this information with order backlogs and production data in detail. I.e. the financial figures are only related to the production data at macro level. This approach weakens the value of historical financial statements data as forecasts.

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[136] *Коммерсантъ, 2 August 2018*, Предприятия ОПК дистанцировались от биржи. [https://www.kommersant.ru/doc/3702838], referred to on 15 April 2019.

[137] *РІА Новости, 18 April 2017*, Не время праздновать: Рогозин раскритиковал ход реформы ОПК. [https://ria.ru/20170418/1492483303.html], referred to on 15 April 2019.

Reviewing the financial statements and reports on operations prepared in accordance with the Russian RAS standards would be a logical follow-up to this study. This would allow the examination of more companies, and provide a basis for a more comprehensive and in-depth analysis of their operations both qualitatively and quantitatively, in the form of an operational review. It could also provide a basis for a more detailed examination of individual subsidiaries of large defence industry corporations. Moreover, researchers could analyse in more detail what lies behind economic indicators, for example by examining trends in value added or cost structures.

Secondly, the economic analysis could be supplemented with other indicators, such as personnel structures or wage trends, and by comparing them with the situation in other sectors. This could provide a more detailed and analytical picture of the developments in the sector at macro and micro level.

Thirdly, the financial analysis of the sector could be more closely connected with domestic-policy and foreign-policy developments. For example: what is the role played by defence industry sector in social, labour and regional policy? What type of funding has been provided by international partners for such purposes as projects and industrial development?

The authors hope that the findings and conclusions presented in this report would encourage further research on the topic.

APPENDICES

Appendix 1. Economic indicators of the companies

Table 8. Economic indicators of the Russian companies reviewed in the study - profitability, solvency and liquidity

Name	Products, ownership	Head office	Year	Turnover (RUB million)	Number of employees	EBIT (RUB million)	EBIT-%	Profit/loss for the period (RUB million)	ROCE (%)	Gearing (%)	Equity ratio (%)	Current ratio
ОАК	Aircraft	Moscow	**2017**	451,800	102,000	21,600	4.8					
ОАК	State		**2016**	416,926	96,787	11,203	2.7	-4,481	4.3	175.2	15.7	1.3
			2015	346,120	96,545	-69,412	-20.1	-109,946	-14.2	123.1	19.7	1.4
			2014	294,538	98,800	4,212	1.4	-13,654	2.0	203.3	17.7	1.3
			2013	220,065	93,950	1,135	0.5	-13,508	1.0	204.3	19.1	1.4
ОСК	Ships	St Petersburg	**2017**	325,708	94,964	14,419	4.4	5,914	7.4	30.8	28.1	1.1
OSK	State		**2016**	301,946	91,878	4,241	1.4	3,214	6.6	-12.4	26.0	1.0
			2015	279,226	88,237	840	0.3	5,373	4.3	394.1	12.2	0.5
			2014	237,223	81,411	494	0.2	4,656	1.5	588.5	8.0	0.6
Вертолёты России	Helicopters	Moscow	**2016**	214,360	43,495	32,395	15.1	16,431	12.7	68.6	36.8	1.0
Vertolety Rossii	Rostec		**2015**	219,972	41,800	58,594	26.6	41,965	23.4	85.6	36.9	1.0
			2014	169,842	42,000	39,404	23.2	21,108	21.9	140.4	30.7	0.9
			2013	138,263		20,614	14.9	9,390	14.9	196.9	24.7	0.8
ОДК	Engines	Moscow	**2016**	189,578	91,856	31,865	16.8	19,001	21.3	722.1	8.6	1.2
ODK	Rostec		**2015**	177,469	88,500	34,628	19.5	6,985	25.7	-1402.9	-6.8	0.8
			2014	140,947	80,000	3,178	2.3	-30,690	5.6	-330.8	-35.8	0.7
Уралвагонзавод	Main battle tanks, railway carriages		**2016**	132,339	29,580	5,441	4.1	-5,306	-1.4	396.4	14.0	0.9
Uralvagonzavod		Nizhny Tagil	**2015**	92,896	30,284	1,114	1.2	-16,441	-5.7	462.3	15.9	0.8
	Rostec		**2014**	127,516	30,954	9,688	7.6	-5,293	-4.0	302.5	21.7	1.0
			2013	74,632		-1,028	-1.4	-7,036	-5.9	163.8	33.3	0.9
Калашников	Handguns, UAVs, assault boats	Izhevsk	**2016**	18,342	5,930	3,271	17.8	2,346	24.8	177.0	25.7	0.9
Kalashnikov			**2015**	8,474	5,128	504	5.9	2,050	9.5	78.5	26.9	0.7
	Rostec		**2014**	2,948	4,960	-3,542	-120.1	-200	-192.3	-288.3	-12.6	0.6

Table 9. Economic indicators of the Russian companies reviewed in the study - capital expenditure and research and development expenditure

Name (in Russian and in transliterated form)	Year	Capital expenditure (RUB million)	Capital expenditure/depreciation (%)	R&D expenditure (RUB million)	R&D expenditure (% of turnover)
ОАК	**2016**	45,864	219	958	0.23
OAK	**2015**	30,701	67	542	0.16
	2014	38,999	179	651	0.22
	2013	34,832	217	370	0.17
ОСК	**2017**	14,533	207	0	0
OSK	**2016**	7,497	99	0	0
	2015	12,572	185	0	0
	2014	12,218	15	0	0
Вертолёты России	**2016**	17,511	114	4,025	1.88
Vertolety Rossii	**2015**	19,358	200	1,407	0.64
	2014	20,582	195	2,396	1.41
	2013	16,547	251	1,609	1.16
ОДК	**2016**	17,733	499	2,917	1.54
ODK	**2015**	15,824	522	1,122	0.63
	2014	15,474	297	1,226	0.87
Уралвагонзавод	**2016**	12,271	106	0	0
Uralvagonzavod	**2015**	25,931	458	0	0
	2014	62,174	637	0	0
	2013	38,303	373	0	0
Калашников	**2016**	4,490	499	0	0
Kalashnikov	**2015**	1,655	522	0	0
	2014	561	297	0	0

Table 10. Economic indicators of Airbus and Saab - profitability, solvency and liquidity

Name	Sector and ownership	Head office	Year	Turnover (EUR/SEK million)	Number of employees	EBIT (EUR/SEK million)	EBIT-%	Profit/loss for the period (EUR/SEK million)	ROCE (%)	Gearing (%)	Equity ratio (%)	Current ratio
Airbus	Aviation and space technology	Leiden	2016	66,581	133,782	2,258	3.4	1,000	3.4	1232.0	5.1	0.9
			2015	64,450	136,574	4,062	6.3	2,698	5.3	741.0	8.8	0.9
Saab	Multi-sector	Stockholm	2016	28,631	15,466	1,797	6.3	1,175	5.7	139.0	36.9	1.5
			2015	27,186	14,685	1,900	7.0	1,402	6.5	138.5	37.9	1.6

Table 11. Economic indicators of Airbus and Saab - capital expenditure and research and development expenditure

Name	Year	Capital expenditure (EUR/SEK million)	Capital expenditure/depreciation (%)	R&D expenditure (EUR/SEK million)	R&D expenditure (% of turnover)
Airbus	2016	3,180	138.6	2,970	4.46
	2015	3,002	121.7	3,460	5.37
Saab	2016	1,689	181.2	1,592	5.56
	2015	1,393	138.2	1,565	5.76

Appendix 2. Calculation formulas used

1) Return on capital employed (ROCE) measures the relative profitability of the company. In practice, interest-free debts comprise advance payments received and accounts payable.

$$\text{ROCE} = \frac{EBIT\ +\ financing\ income}{Capital\ employed} = \frac{EBIT + financing\ income}{Balance\ sheet\ -\ interest - free\ debts}$$

2) Gearing describes the ratio of the company's interest-bearing net liabilities to equity.

$$Gearing\ = \frac{Liabilities\ -\ interest - free\ debt\ -\ liquid\ assets}{Equity}$$

3) Equity ratio describes how much of the company's assets have been funded with the company's equity. In addition to share capital, equity also includes the provisions made under equity, and minority interests.

$$Equity\ ratio = \frac{Equity}{Balance\ sheet\ total\ -\ advance\ payments\ received}$$

4) Current ratio measures the company's liquidity on the closing date.

$$Current\ ratio = \frac{Financial\ assets\ +\ current\ assets}{Short - term\ liabilities}$$

5) Net financing expenses describe how much of the company's EBITDA is spent on financing expenses paid from liabilities (debts).

$$Net\ financing\ expenses\ = \frac{Net\ financing\ expenses}{EBITDA}$$

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